FINAL

Site Inspection Report for Madison Barracks Target Range, Henderson, New York

DERP FUDS Project No. **C02NY020400**

Prepared Under: **Contract No. W912DY-04-D-0017**
Task Order # 00170001

Prepared for:
U.S. Army Engineering and Support Center, Huntsville
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December 2010

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December 2010

CONTRACTOR STATEMENT OF AUTHORSHIP AND INDEPENDENT TECHNICAL REVIEW

HFA/TPMC prepared this Site Inspection Report on behalf of Alion Science and Technology Corporation for Madison Barracks Target Range, Formerly Used Defense Site (FUDS), Project No. C02NY020400. An independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Programmatic Work Plan. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures, and material used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with existing Corps policy. In accordance with Corps requirements, significant authors to this report are presented below.

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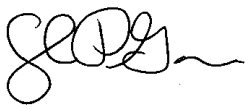
Cheryl Gannon Deputy Program Manager HFA/TPMC (Under contract to Alion)	12/17/2010	
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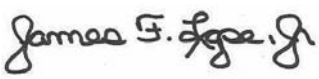
Jim Lape Risk Assessor Integral Consulting, Inc. (Under contract to Alion)	12/17/2010	
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Significant concerns and explanation of the resolutions are documented within the project file.

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LIST OF ACRONYMS AND ABBREVIATIONS

Alion	Alion Science and Technology Corporation
ASR	Archive Search Report
BG	Background
bgs	Below ground surface
CAS	Chemical Abstract Service
CDQAR	Chemical Data Quality Assessment Report
CENAB	Corps of Engineers North Atlantic Division Baltimore District
CENAN	Corps of Engineers North Atlantic New York
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHE	Chemical Warfare Materiel Hazard Evaluation
CONUS	Continental United States
COPC	Chemical of Potential Concern
COPEC	Chemical of Potential Ecological Concern
CQAR	Chemical Quality Assurance Report
CSM	Conceptual Site Model
CTT	Closed Transferring and Transferred
CWM	Chemical Warfare Materiel
CWS	Chemical Warfare Service
CX	Center of Expertise
DA	Department of the Army
DC	Design Center
DERP	Defense Environmental Restoration Program
DGM	Digital Geophysical Mapping
DMM	Discarded Military Munitions
DNT	Dinitrotoluene
DoD	Department of Defense
DoI	Department of Interior
DQI	Data Quality Indicator
DQO	Data Quality Objective
Eco-SSL	Ecological Soil Screening Level
EDMS	Environmental Data Management Systems
EDS	Environmental Data Services, Inc.
EHE	Explosive Hazard Evaluation
EHSI	Environmental Hazards Specialists International, Inc.
EM	Engineering Manual
EOD	Explosive Ordnance Disposal
EP	Engineering Pamphlet

LIST OF ACRONYMS AND ABBREVIATIONS

˚F	Degree (s) Fahrenheit
ft	Foot or Feet
FUDS	Formerly Used Defense Site(s)
FUDSMIS	FUDS Management Information System
GIS	Geographic Information Systems
HFA	Human Factors Applications Inc.
HHE	Health Hazard Evaluation
HHRA	Human Health Risk Assessment
HRS	Hazard Ranking System
HTRW	Hazardous Toxic and Radioactive Waste
HQ	Hazard Quotient
ID	Identification
In.	Inch (es)
INPR	Inventory Project Report
ITRC	Interstate Technology and Regulatory Council
J	Analyte is present. Reported value may not be accurate or precise.
m	Meter
M	Model
MC	Munitions Constituents
MCL	Maximum Contaminant Level
MD	Munitions Debris
MDL	Method Detection Limit
MEC	Munitions and Explosives of Concern
mg/kg	Milligram per kilogram
mi	mile(s)
mm	millimeter(s)
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MQO	Measurement Quality Objective
MRA	Munitions Response Area
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
MS/MSD	Matrix Spike/Matrix Spike Duplicate
msl	Mean Sea Level
NAD	North American Datum
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	No Detection
NDAI	No Department of Defense Action Indicated

LIST OF ACRONYMS AND ABBREVIATIONS

NG	Nitroglycerin
NOAA	National Oceanic and Atmospheric Administration
NSL	No Screening Level
NTCRA	Non-Time Critical Removal Action
NYSDEC	New York State Department of Environmental Conservation
NYS GISC	New York State Geographic Information Systems Clearinghouse
NYS OPRHP	New York State Office of Parks, Recreation, and Historic Preservation
PFSP	Programmatic Field Sampling Plan
PGM	Program Manager
PM	Project Manager
PMMQL	Preferred Maximum Method Quantitation Limits
PWP	Programmatic Work Plan
PWS	Performance Work Statement
QA	Quality Assurance
QC	Quality Control
QR	Qualitative Reconnaissance
QSM	Quality Systems Manual
RAC	Risk Assessment Code
RCWM	Recovered Chemical Waste Materiel
RI/FS	Remedial Investigation /Feasibility Study
RL	Reporting Limit
RMIS	Range Management Information System
ROE	Right-of-Entry
SHPO	State Historic Preservation Office
SI	Site Inspection
SL	Screening Level
SLERA	Screening Level Ecological Risk Assessment
SS	Surface Soil
SSL	Soil Screening Level
SS-WP	Final Site-Specific Work Plan Addendum to the MMRP Programmatic Work Plan for the Site Inspection of Madison Barracks Target Range
T&E	Threatened and Endangered
TPMC	TerranearPMC LLC
TCRA	Time Critical Removal Action
TPP	Technical Project Planning
U	Not detected
UJ	Not detected. The associated detection limit is an estimate and may be

LIST OF ACRONYMS AND ABBREVIATIONS

	inaccurate or imprecise. Value are reporting limits (RLs)
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
WOE	Weight-of-Evidence

GLOSSARY OF TERMS

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) – Congress enacted CERCLA, commonly known as Superfund, on 11 December 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment (USACE 2004a).

Discarded Military Munitions (DMM) – Military munitions that have been abandoned without proper disposal, or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance; military munitions that are being held for future use or planned disposal; or military munitions that have been properly disposed of, consistent with applicable environmental laws and regulations. (10 USC 2710(e)(2)) (Department of the Army [DA] 2005).

Explosive Ordnance Disposal (EOD) – The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded explosive ordnance and other munitions that have become an imposing danger, for example, by damage or deterioration (DA 2005).

Explosives Safety – A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of potential mishaps involving military munitions (DA 2005).

Formerly Used Defense Site (FUDS) – A FUDS is defined as a facility or site (property) that was under the jurisdiction of the Secretary of Defense and owned by, leased to, or otherwise possessed by the United States at the time of actions leading to contamination by hazardous substances. By the Department of Defense (DoD) Environmental Restoration Program (DERP) policy, the FUDS program is limited to those real properties that were transferred from DoD control prior to 17 October 1986. FUDS properties can be located within the 50 States, District of Columbia, Territories, Commonwealths, and possessions of the United States. ER 200-3-1 (May 10, 2004).

Material Potentially Presenting an Explosive Hazard (MPPEH) – Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions (DA 2005).

GLOSSARY OF TERMS

Military Munitions – All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents; chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges; and devices and components thereof. The term does not include wholly inert items; improvised explosive devices; and nuclear weapons, nuclear devices, and nuclear components, other then nonnuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 USC 2011 et seq.) have been completed. (10 USC 101(e)(4)(A) through (C)) (DA 2005).

Munitions and Explosives of Concern (MEC) – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) Unexploded ordnance (UXO), as defined in 10 USC 101(e)(5); (B) DMM, as defined in 10 USC 2710(e)(2); or (C) Munitions constituents (e.g., trinitrotoluene, hexahydro-1,3,5-trinitro-1,3,5-triazine), as defined in 10 USC 2710(e)(3), present in high enough concentrations to pose an explosive hazard (DA 2005).

Munitions Constituents (MC) – Any materials originating from UXO, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 USC 2710(e)(3)) (DA 2005).

Munitions Debris (MD) – Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal (DA 2005).

Munitions Response Area (MRA) – Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites (32 Code of Federal Regulations [CFR] 179.3).

Munitions Response Site (MRS) – A discrete location within a Munitions Response Area that is known to require a munitions response (32 CFR 179.3).

GLOSSARY OF TERMS

Munitions Response Site Prioritization Protocol (MRSPP) – The MRSPP was published as a rule on 5 October 2005. This rule implements the requirement established in Section 311(b) of the National Defense Authorization Act for Fiscal Year 2002 for the DoD to assign a relative priority for munitions responses to each location in the DoD's inventory of defense sites known or suspected of containing UXO, DMM, or MC. The DoD adopted the MRSPP under the authority of 10 USC 2710(b). Provisions of 10 USC 2710(b) require that the DoD assign to each defense site in the inventory a relative priority for response activities based on the overall conditions at each location and taking into consideration various factors related to safety and environmental hazards.

Non-Time Critical Removal Action (NTCRA) – Actions initiated in response to a release or threat of a release that poses a risk to human health or the environment where more than six months planning time is available (USACE 2007).

Range – A designated land or water area that is set aside, managed, and used for range activities of the DoD. The term includes firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access and exclusionary areas. The term also includes airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration. (10 USC 101(e)(1)(A) and (B)) (DA 2005).

Range Activities – Research, development, testing, and evaluation of military munitions, other ordnance, and weapons systems; and the training of members of the armed forces in the use and handling of military munitions, other ordnance, and weapons systems. (10 USC 101(e)(2)(A) and (B)) (DA 2005).

Range Related Debris – Debris, other than munitions debris, collected from operational ranges or from former ranges (e.g. target debris, military munitions packaging, and crating material).

Risk Assessment Code (RAC) – An expression of the risk associated with a hazard. The RAC combines the hazard severity and accident probability into a single Arabic number on a scale from 1 to 5, with 1 being the greatest risk and 5 the lowest risk. The RAC is used to prioritize response actions (USACE 2004a).

Time Critical Removal Action (TCRA) – Removal actions conducted to respond to an imminent danger posed by the release or threat of a release, where cleanup or stabilization actions must be initiated within 6 months to reduce risk to public health or the environment (DA 2005).

Unexploded Ordnance (UXO) – Military munitions that (A) have been primed, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded whether by malfunction, design, or any other cause. (10 USC 101(e)(5)(A) through (C)) (DA 2005).

EXECUTIVE SUMMARY

ES.1 Under contract with the United States Army Corps of Engineers (USACE), Alion Science and Technology Corporation (Alion) prepared this Site Inspection (SI) Report to document SI activities and findings for the Madison Barracks Target Range Formerly Used Defense Site (FUDS), Property No. C02NY0204, located in Jefferson, Henderson County, New York. The Department of Defense (DoD) has established the Military Munitions Response Program (MMRP) under the Defense Environmental Restoration Program (DERP) to address potential Munitions and Explosives of Concern (MEC) and Munitions Constituents (MC) remaining at FUDS. This SI was completed under MMRP Project No. C02NY020400 and addresses potential MMRP hazards remaining at the Madison Barracks Target Range FUDS.

ES.2 **Site Inspection Objectives and Scope**. The primary objective of the MMRP SI is to determine whether or not the FUDS project warrants further response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The SI collects the minimum amount of information necessary to make this determination. The SI also (i) determines the potential need for a Time Critical Removal Action (TCRA); (ii) collects or develops additional data, as appropriate, for potential Hazard Ranking System (HRS) scoring by the United States Environmental Protection Agency (USEPA); and (iii) collects data, as appropriate, to characterize the hazardous substance release for effective and rapid initiation of the remedial investigation/feasibility study (RI/FS). An additional objective of the SI is to collect the additional data necessary to evaluate munitions response sites (MRSs) using the Munitions Response Site Prioritization Protocol (MRSPP).

ES.3 The scope of the SI is restricted to the evaluation of the presence of MEC or MC related to historical use of the FUDS prior to property transfer. Potential releases of hazardous, toxic, and/or radioactive waste (HTRW) are not within the SI scope.

ES.4 **Madison Barracks Target Range**. The Madison Barracks Target Range FUDS is comprised of approximately 866 acres and included a small arms range used for training purposes. The Madison Barracks Target Range was used between 1885 and 1947 as a troop staging and training area. Approximately 24 acres of the Madison Barracks Target Range property was used for small arms training (.30, .45, and .50 calibers) and continues off the FUDS boundary based on review of 1958 aerial photography and the location of the berm. The firing points of the small arms range are located on the FUDS property (866 acres) while the impact berm is not. The range was closed in 1947 when the property was transferred to the War Assets Administration from the War Department. Later, in 1947, the entire 866 acres was conveyed to a

private owner with no restoration, recapture, or restrictive clauses, who later sold the property to the state of New York. The property is now part of Robert G. Wehle State Park (USACE 1991 and USACE 2004b).

ES.5 **Technical Project Planning.** The SI approach was developed in concert with stakeholders through USACE's technical project planning (TPP) framework, which was applied at the initial TPP meeting on 13 May 2009. Stakeholders agreed to the SI approach, as presented and modified during the TPP meeting and finalized in the Site-Specific Work Plan (SS-WP). In summary, these agreements were to focus the SI activities at the small arms range since no other MRSs were identified and the UXO tech did not identify any munitions-related material near the pill boxes or elsewhere on the site. Stakeholders agreed to environmental sampling at the firing points and impact berm of the small arms range, as reflected in the Data Quality Objectives (DQOs) and Final Site SS-WP. The small arms range is approximately 24 acres and continues off the FUDS boundary, based on review of 1958 aerial photography and the location of the berm. The firing points of the small arms range are located on the FUDS property (866 acres) and the impact berm is not on the FUDS property; however, the entire range and impact berm are within the Robert G. Wehle State Park property.

ES.6 **Munitions Response Sites.** USACE programmatic range documents identified one MRS area at the Madison Barracks Target Range FUDS: MRS 1, Madison Barracks Target Range (Restoration Management Information System [RMIS] Range ID No. C02NY020400R01).

ES.7 **Site Qualitative Reconnaissance (QR)**. SI field activities were performed 27 April 2010. A qualitative site reconnaissance of MRS 1 was performed over approximately 1.9 acres of land during which analog geophysics was conducted and visual observations were made, where possible. The approach included magnetometer-assisted reconnaissance following a meandering path in and around sampling locations to verify the location of the former range and to identify the presence/absence of MEC/Munitions Debris (MD) or other areas of interest (i.e. areas having indications of munitions use). During the reconnaissance and sampling activities, numerous anomalies were detected at MRS 1 that included bullet slugs observed on the surface.

ES.8 **Munitions and Explosives of Concern Assessment**. A qualitative MEC screening level risk assessment was conducted based on the SI qualitative reconnaissance, as well as historical data documented in the Inventory Project Report (INPR) and the INPR Supplement. Since military use ended in 1946, no MEC have been reported by local residents or park personnel. Neither MEC nor MD was found during the 1991 USACE site visit and no MEC was observed during this SI. The MEC explosive safety risk is based on the presence or absence of a MEC

source, the accessibility or pathway to that source, and potential receptor contact with the source. The potential risk posed by MEC, assessed through three risk factors (i.e., presence of MEC source, accessibility or pathway presence, and potential receptor contact), was low for MRS 1. While public access to the property is open during daylight hours, the potential MEC risk is determined to be low given the condition of MD (expended bullet slugs), the condition of the location of the MD (heavily vegetated), and the types of munitions (small arms) used at the MRS 1.

ES.9 **Munitions Constituents Sampling and Risk Screening**. A total of seven surface soil samples were collected at MRS 1. Five of the seven surface soil samples were collected from the impact area (berm) and two of the seven surface soil samples were collected from the firing points. The background soil samples were collected from similar geology just outside the southern FUDS boundary. A list of MC potentially associated with munitions used at the FUDS (MRS 1) was developed and used to support sample analysis and assessment of results for the risk screening. The list of specific MC for MRS 1 included a complete list of possible MC associated with munitions used onsite including copper, iron, lead, nickel, dinitrotoluene (DNT) and DNT breakdown products (2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, 2-amino-4,6-dinitrotoluene, 4-amino-2,6-dinitrotoluene, and 4-nitrotoluene), and Nitroglycerin (NG).

ES.10 **Risk Screening.** NG was the only explosive detected in surface soils sampled at MRS 1. NG was detected in one of three samples for which it was analyzed. The single NG detection (5.7 milligrams per kilogram [mg/kg]; sample, MBTR-MR1-SS-01-06) was above the screening level adopted for screening risks to trespassers and recreational visitors (0.61 mg/kg), but fell below the level adopted for risks to employees (6.2 mg/kg). NG was not detected in the duplicate sample collected at the same location. Iron and lead were also detected above their respective human health screening levels. Copper and lead were detected at concentrations that exceeded their respective ecological screening levels. Three Chemicals of Potential Concern (COPC) were identified (NG, lead, and iron) and two Chemicals of Potential Ecological Concern (COPEC) were identified (copper and lead) in surface soil at MRS 1.

ES.11 **Conclusions and Recommendations.** MRS 1, specifically the small arms range, was assessed during this SI of the Madison Barracks Target Range FUDS. Historically, no finds of munitions (MEC/MD) have been reported by local residents or park personnel. The potential for an explosive safety risk is considered low based on the evaluation of the potential presence of three elements: a source (presence of MEC/MD), a receptor (person), and interaction (e.g., touching or picking up an item). However, MC analytes were detected and both COPCs (NG,

iron, lead) and COPECs (copper and lead) were identified based on detections above the respective screening levels. Based on a weight of evidence (WOE) evaluation, NG is not expected to pose unacceptable risk to human receptors. Measured concentrations of iron were below background, and therefore, no additional FUDS related risk was identified. Lead was determined to pose a potentially unacceptable risk to human receptors. This risk conclusion is based on a comparison of lead concentrations in surface soils to residential screening levels. Exposures for skiers and hikers who currently use the area for recreational purposes are not considered to represent an imminent and substantial risk because they are expected to have much lower exposures than what is assumed in the residential screening levels. Copper and lead were determined to pose a potentially unacceptable risk to ecological receptors. Based on these findings and conclusions, a Remedial Investigation/Feasibility Study (RI/FS) is recommended at MRS 1 to focus on MC. A TCRA or Non-TCRA (NTCRA) is not recommended at the Madison Barracks Target Range FUDS (Table ES-1). USACE should revise the MRS acreage to reflect the 24-acre range in lieu of using the 866 acres which represents the entire FUDS property shown in the INPR Supplement.

Table ES-1. Summary of Site Recommendations for Madison Barracks Target Range (FUDS Project No. C02NY020400)

MRS	Recommendation	Basis for Recommendation	
		MEC	**MC**
MRS 1 – Madison Barracks Target Range	RI/FS recommendation to focus on MC TCRA/NTCRA not recommended	MEC Assessment: Low hazard MEC has not been reported historically and was not observed during the 2010 SI field event. However, numerous expended bullets slugs (.22, .30, .38, and .45 caliber) were observed.	*Risk Screening Assessment:* Unacceptable risks to human (lead) and ecological (lead and copper) receptors were identified. *Surface soil:* NG, iron and lead were detected above the human health screening level and identified as COPCs. NG is not expected to result in unacceptable risks to human receptors based on a WOE evaluation. Iron was detected at concentrations below background, and no additional FUDS related risk to human receptors was identified. Lead was determined to present a potentially unacceptable risk to human receptors. Lead and copper were detected above ecological SLs and were identified as COPECs. Based on the WOE lead and copper were determined to present potentially unacceptable risks to ecological receptors.

COPC – Chemical of Potential Concern	MRS – Munitions Response Site
COPEC – Chemical of Ecological Potential Concern	NTCRA – Non-Time Critical Removal Action
FUDS – Formerly Used Defense Site	RI/FS – Remedial Investigation/Feasibility Study
MC – Munitions Constituents	SI – Site Investigation
MEC – Munitions and Explosives of Concern	TCRA – Time Critical Removal Action
	WOE – Weight of Evidence

1. INTRODUCTION

1.0.1 This report documents the findings of the Military Munitions Response Program (MMRP) Site Inspection (SI) performed at the Madison Barracks Target Range Formerly Used Defense Site (FUDS) located within Henderson, Jefferson County, New York with the MMRP Project No. C02NY020400. Alion Science and Technology Corporation (Alion), with support from its subcontractors (Human Factors Applications, Inc./TerranearPMC, LLC, Environmental Data Services, Inc. [EDS]; Integral Consulting Inc.; and TestAmerica, Inc.); prepared this report under contract to the United States Army Engineering and Support Center, Huntsville (USAESCH). This work is being performed in accordance with Contract No. W912DY-04-D-0017, Task Order 00170001 for FUDS in the Northeast Region of the Continental United States. USAESCH transferred management of the contract to the Corps of Engineers North Atlantic Division Baltimore District (CENAB). CENAB is working with Corps of Engineers North Atlantic Division New York District (CENAN) and its contractor on the completion of this project in accordance with the SI Performance Work Statement (Appendix A).

1.0.2 The technical approach to this SI is based on the *Programmatic Work Plan for Formerly Used Defense Sites Military Munitions Response Program Site Inspections at Multiple Sites the Northeast Region* (Alion 2005) and the *Final Site-Specific Work Plan* (SS-WP) *Addendum to the MMRP Programmatic Work Plan for the Site Inspection of Madison Barracks Target Range* (Alion 2009b).

1.1 Project Authorization

1.1.1 The Department of Defense (DoD) has established the MMRP to address sites suspected of containing Munitions and Explosives of Concern (MEC) or Munitions Constituents (MC). Under the MMRP, the U.S. Army Corps of Engineers (USACE) is conducting environmental response activities for the Army, as DoD's Executive Agent for the FUDS program.

1.1.2 Pursuant to USACE's Engineer Regulation 200-3-1 (USACE 2004b) and the *Management Guidance for the Defense Environmental Response Program (DERP)* (DoD 2001), USACE is conducting FUDS response activities in accordance with the DERP statute (10 USC 2701 et seq.), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC Section 9620), Executive Orders 12580 and 13016, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations Part 300). As such, USACE is conducting SIs, as set forth in the NCP, to evaluate hazardous substance releases or threatened releases from eligible FUDS.

1.1.3 While not all MEC/MC constitute CERCLA hazardous substances, pollutants, or contaminants, the DERP statute provides DoD the authority to respond to releases of MEC/MC, and DoD policy states that such responses shall be conducted in accordance with CERCLA and the NCP.

1.2 Project Scope and Objectives

1.2.1 The primary objective of the MMRP SI is to determine whether or not the FUDS project warrants further response action under CERCLA. The SI collects the minimum amount of information necessary to make this determination. The SI also (i) determines the potential need for a removal action; (ii) collects or develops additional data, as appropriate, for potential Hazard Ranking System (HRS) scoring by the U.S. Environmental Protection Agency (USEPA); and (iii) collects data, as appropriate, to characterize the hazardous substance release for effective and rapid initiation of the remedial investigation/feasibility study (RI/FS). An additional objective of the MMRP SI is to collect data necessary to evaluate munitions response sites (MRSs) using the Munitions Response Site Prioritization Protocol (MRSPP).

1.2.2 The scope of the SI is restricted to the evaluation of the presence of MEC or MC related to historical use of this FUDS prior to property transfer. The evaluation is performed through records review, qualitative site reconnaissance to assess MEC presence/absence, and sampling where MC might be expected based on the conceptual site model (CSM). Evaluation of potential releases of hazardous, toxic, and radioactive waste (HTRW) is not within the scope of this SI.

1.3 Project Location

1.3.1 Madison Barracks Target Range is located in Henderson, Jefferson County, New York (Appendix A – Figure 2). The North American Datum (NAD) 1983 Universal Transverse Mercator (UTM) Zone 19N, easting (X) and northing (Y) coordinates for the approximate center of the FUDS are 397181.00 meters (m) and 4858237.00 m, respectively. This FUDS falls under the geographical jurisdiction of USACE, New York District (USACE 2004b).

1.4 Munitions Response Site Prioritization Protocol

1.4.1 This SI Report includes a draft MRSPP ranking which applies to MRS 1, Madison Barracks Target Range [Appendix K]. The MRSPP scoring will be updated on an annual basis, or when necessary, to incorporate new information, as appropriate.

2. SITE DESCRIPTION

2.1 Site Description and History

2.1.1 The Madison Barracks Target Range FUDS is approximately 866 acres in areal extent located at the western most side of Stony Point in Henderson, NY. The Army acquired portions of the land in May 1885 and November 1907. Between 1885 and 1947, the site was used as a troop staging and training area. A portion of the property was used as a practice target range for small arms including .45 caliber pistol, .50 caliber machine gun, and .30 caliber Springfield and M-1 rifles as reported in the Inventory Project Report (INPR) and INPR Supplement. In addition, .22 caliber and .38 caliber were also identified at the berm during the 2010 SI field activities. Former structures at this FUDS included a water tower, six "pill boxes", numerous concrete footings of old buildings, and numerous inhabited buildings (former offices, sheds, and residential) (Alion 2009b and USACE 2004b).

2.1.2 The Madison Barracks Target Range FUDS is approximately 866 acres and approximately 24 acres of the property was used for small arms training. Additionally, the presence of pill boxes indicates the possibility that practice firing took place from vehicle-mounted guns aimed at targets towed from planes flying over Lake Ontario (pill boxes may have been used as lookout posts for spotters who would look for passing boats). Four of the six remaining pill boxes are located at the edge of the lake on barren rock while two are inland. The Madison Barracks Training Range was closed in 1947 when the property was transferred to the War Assets Administration from the War Department. Later, in 1947, the entire 866 acres was conveyed to a private owner with no restoration, recapture, or restrictive clauses (Alion 2010, USACE 1991 and USACE 2004b).

2.2 Munitions Response Site Identification and Munitions Information

2.2.1 The INPR Supplement identified Madison Barracks Target Range (MRS 1) as the only area of interest at the FUDS (USACE 2004b) (Table 2-1 and Figure 2-3). The INPR Supplement mistakenly identified the acreage of MRS 1 as 866 acres, the same as the FUDS property acreage. However, during the TPP meeting it was agreed that the focus of this SI would be the small arms range where training activities occurred since the UXO tech did not identify anything munitions related at the pill boxes. Therefore, the boundary and acreage should be revised to include only the small arms range as MRS 1. The small arms range acreage continues off of the FUDS boundary and is approximately 24 acres based on review of 1958 aerial photography and the location of the berm (Appendix L).

2.3 Physical Setting

2.3.0.1 The following sections provide a physical description of the FUDS property with respect to relief, vegetation, and climate as well as the local demographic and land use.

2.3.1 Topography and Vegetation

2.3.1.1 The former Madison Barracks Target Range FUDS is located in Henderson, New York, which is located on the shoreline of Lake Ontario in what is now Wehle State Park. The area as a whole varies in elevation from 270 feet (ft) to approximately 330 ft. above mean sea level (msl) (USACE 2004b). A topographic map of the area surrounding Madison Barracks Target Range is included as Figure 2-4 of this report.

2.3.1.2 The vegetation is predominantly a mixed forest including deciduous (maple, birch and beech trees) and evergreen Needle Leaf trees. The southern portion of the FUDS contains woody wetlands. The site is bordered to the northwest by Lake Ontario and to the east by Wehle State Park which has similar vegetation (USGS 2009a).

2.3.2 Climate

2.3.2.1 The location of the property on Lake Ontario tempers the wide swings of hot and cold temperatures that are characteristic of this latitude. The stabilizing effect of the lake also results in infrequent thunderstorms. During the winter, the coldest temperature will range between 0 and -10° F. Due to the heavy ice accumulations on Lake Ontario during the winter, spring is cooler and typically delayed until May or early June with summer arriving in mid-June (NOAA 2005).

2.3.3 Local Demographics

2.3.3.1 The Madison Barracks Target Range FUDS is located in Jefferson County, New York. The population density of Jefferson County is 87.8 people per square mile (mi^2). The 2000 Census indicates that there were 111,738 people and 54,070 households in Jefferson County, New York (U.S. Census Bureau 2000). The area is used for recreational purposes (Wehle State Park) and receives a high volume of visitors each year, especially during the summer months. There are less than 26 residences within a two mile distance of the MRS boundaries (Google Earth 2010).

2.3.4 Current and Future Land Use

2.3.4.1 The Madison Barracks Target Range FUDS is currently Wehle State Park and used for fishing, hiking, bird watching, biking, cross-country skiing, limited hunting and other recreational

activities. The New York State (NYS) Office of Parks, Recreation and Historic Preservation (OPRHP) managed the land subsequent to its opening to the public in 2004. Future land use is not expected to change and no construction activities are planned in the firing range area in the near future (NYSDEC 2009b).

2.3.5 Geologic Setting

2.3.5.1 During the Pleistocene epoch, the Labradorian ice of the Laurentide glacial ice sheets, thousands of feet thick, covered all of what is now northwestern New York. During the Wisconsin stage of the Pleistocene epoch, ice formed in the mountains of the northeastern part of North America and traveled out in different directions. The advancement of ice was slow and was followed by an equally slow retreat. In the Watertown and Sackets Harbor area, the remains of the previous glacial stages were destroyed by subsequent glaciation and therefore all current surficial deposits are most likely from the Cary and Mankato substages. During the early phase of the Cary substage, the Ontario Ice Lobe, originating in the St. Lawrence Valley, extended south. Upon reaching the Tug Hill escarpment, the Ontario Ice Lobe split in two lobes in order to advance down either side of the plateau. As the glacier advanced south, it acquired past glacial deposits, bedrock, and soil (Stewart 1958 and USGS 2009b).

2.3.5.2 Bedrock escarpments are the cause of the irregular surface expression in the lake plain area of Henderson, NY. The bedrock escarpments are the result of glacial erosion of the underlying Trenton bedrock. The bedrock of the Trenton Group is typically fossiliferous and consist of limestone layers containing alternating beds of calcareous shale (Stewart 1958 and USGS 2009b).

2.3.5.3 Typical soil within the FUDS is the very rocky Bebson-Galoo complex and the Galoo-Rock outcrop complex. There are also smaller areas consisting of very rocky Benson-Galoo channery silt loam, Farmington loam, and Galway silt loam (USDA 2009).

2.3.6 Hydrogeologic Setting

2.3.6.1 Madison Barracks Target Range is located on the shoreline of Lake Ontario. The area is drained by streams that flow west and southwest across the lake plain to Lake Ontario. The courses of the streams, usually parallel to the movement of the previous ice glacier, are generally straight but do contain some sharp angular changes. The directions of these streams are mostly due to the erosive work of the Pleistocene glaciers (Stewart 1958 and USGS 2009b).

2.3.6.2 The groundwater at Madison Barracks Target Range is contained within the bedrock and in unconsolidated glacial meltwater deposits. There are several principle aquifers located to the east and southeast of the FUDS (USGS 2009c).

2.3.6.3 Several wells are located in the southern and southwestern portion of the property. The well in the southwest portion of the FUDS is screened at 180 feet deep and is not considered to be a potential pathway to receptors given the absence of a contaminant transport (Alion 2009a).

2.3.7 Area Water Supply/Groundwater Use

2.3.7.1 According to the USGS National Water Information System Mapper, there are no wells located on the FUDS (USGS 2010). However, during the TPP meeting, it was indicated that there were a few wells on the southern end of the property and one well near the southwestern end of the former Madison Barracks Training Range. This well was screened at 180 feet deep and is not considered to be a potential pathway to receptors given the absence of route of exposure (Alion 2009a).

2.3.8 Sensitive Environments

2.3.8.0.1 The following subsections discuss the sensitive environments associated with the FUDS and the process used to determine the necessity for completing an ecological risk assessment at the FUDS.

2.3.8.1 Army Checklist for Important Ecological Places

2.3.8.1.1 In accordance with USACE Environmental and Munitions Center of Expertise guidance, the Army Checklist for Important Ecological Places (USACE 2006 and 2007) is completed (Table 2-3) to determine if a FUDS requires a screening-level ecological risk assessment. In the case of the former Madison Barracks Target Range, the property contains wetland areas and is located within the New York Coastal Zone. There are state designated critical habits (*calcareous pavement barren and calcareous shoreline outcrop*) within or in the vicinity of MRS 1 (NYSDEC 2009a and NYS OPRHP 2009). Additionally, there is evidence of habitat for the presence of federally rare, threatened, or endangered species in the vicinity of the former Madison Barracks Target Range (NYSDEC 2009a, NYS OPRHP 2009, and USFWS 2009a). Both the endangered Indiana Bat (*Myotis Sodalis*), the threatened cork elm (*ulmus thomasii*), and designated critical habitat for the Piping plover (*Charadrius melodus*) have been identified within Jefferson County. In accordance with USACE guidance, the Army Checklist for Important Ecological Places is used to determine if a FUDS requires a screening-level ecological

risk assessment (USACE 2006 and 2007) (Table 2-3). Consequently, a screening level ecological risk assessment is required, as shown in Section 5 of this SI Report.

2.3.8.2 Wetlands

2.3.8.2.1 Wetlands, specifically freshwater forested/shrub wetlands, are present within the Madison Barracks Target Range FUDS boundary but not the MRS (USFWS 1998). The field sampling activities completed for the Madison Barracks Target Range FUDS did not negatively impact wetlands present at the project site.

2.3.8.3 Coastal Zones

2.3.8.3.1 The Madison Barracks Target Range FUDS is within the New York Coastal Zone. This area is managed under the New York Coastal Management Program, which is administered by the Department of State through the Division of Coastal Resources (NYS DOS 2004). Sampling activities were completed without disturbance to the coastal areas and in accordance with coastal regulations. The field crew stayed on pre-existing paths during sampling activities.

2.4 Previous Investigations for Munitions Constituents and Munitions and Explosives of Concern

2.4.0.1 A summary of previous historical investigations and related discoveries of MC and MEC is provided in the following subsections. Chemical Warfare Materiel (CWM) was not known to be used or stored at the former Madison Barracks Target Range (USACE 1991).

2.4.1 Inventory Project Report

2.4.1.1 USACE issued the INPR for the Madison Barracks Target Range FUDS in 1991 (USACE 1991). The 1991 INPR determined that the present condition of the project site is the result of prior DoD ownership, utilization, or activity. In addition, the INPR determined that an environmental restoration project was an appropriate undertaking within the purview of the DERP for FUDS.

2.4.1.2 The INPR included a property description; physical characteristics of the site; the historical property ownership summary; site eligibility as a FUDS; a visual site inspection; an evaluation of ordnance present at the site; and recommendations. The INPR also included maps, and a preliminary assessment form. The site visit conducted by the USACE on 16 August 1991 found no MEC or munitions related debris. The INPR recommended an SI to focus on target range soils and backstops and to include limited sampling for metals, particularly lead (USACE 1991).

2.4.2 INPR Supplement

2.4.2.1 The INPR Supplement was prepared for the FUDS in 2004 (USACE 2004b). The INPR Supplement designated one MRS as the entire 866-acre Madison Barracks Training Range. As previously stated, the MRS should be limited to the small arms range that was used for training purposes. Based on review of 1958 aerial photography and the location of the (Appendix L), the small arms range is 24 acres; it begins on the north end of the property and continues beyond the FUDS property boundary. The INPR Supplement assigned an overall Risk Assessment Code (RAC) score of 5 for MRS 1. The score indicates the level of MEC risk associated with the area and can range from 1, being the highest category of risk, to 5, being the lowest. Only small arms are suspected at MRS 1 at the Madison Barracks Target Range FUDS (USACE 2004b). Table 2-1 lists the area of evaluation, the associated acreage, the RAC score, and munitions type.

2.4.2.2 The information provided in the Supplement was combined with the information regarding specific munitions presented in the INPR and the property visit, and used to generate Table 2-2, which lists the military munitions type and composition for the FUDS. USACE technical documents, technical manuals, and other technical resources, were used to identify the list of MC associated with each munitions type. A copy of the 2004 INPR Supplement is provided in Appendix L.

2.5 Citizen Reports of Munitions and Explosives of Concern

2.5.1 Since military use of the FUDS ceased, there have been no reports of MEC or MD found at the FUDS (Alion 2009a).

2.6 Non-Department of Defense Contamination/Regulatory Status

2.6.1 As discussed in Section 2.5.1, since military use of the FUDS ceased, there have been no reported finds of military munitions at this FUDS. There is no evidence, based on historical review and stakeholder comments, that activities occurring prior to or after DoD use of the area contributed to potential MEC, MD, or MC presence (USACE 1991 and Alion 2009b).

Table 2-1. Range Inventory (USACE 2004b)

Site Name	Range Name	RMIS Range Number	RAC Score	Acreage
Madison Barracks Target Range	MRS 1 – Madison Barracks Target Range	C02NY020400R01	5	866[1]

RMIS = Restoration Management Information System
RAC = Risk Assessment Code Score. The RAC allows a score of 1 (highest risk) to 5 (lowest risk).
[1] Note- the INPR Supplement mistakenly identifies the area of both the FUDS property and the MRS as 866 acres. During the TPP meeting, it was agreed that the focus of this SI would be the small arms range where training activities occurred, since no other MRSs were identified and no MEC was suspected near the pill boxes or any other area of the site.

Table 2-2. Military Munitions Type and Composition (USACE 1991, USACE 2004b, and other sources)

Range ID (MRS)	Munitions ID	Munitions Type	Composition (explosives and metallic components)	Associated MC Analysis
Madison Barracks Training Range (MRS 1)	Small Arms (CTT01)	Small Arms (.30 caliber, .45 caliber, .50 caliber)	**Projectile:** Lead, antimony [f], cupro-nickel and soft steel (iron [e] and carbon). **Shell casing [d]:** Brass (copper-zinc alloy) or Steel (iron and carbon) **Propellant [a]:** Single or double – base smokeless powder (nitrocellulose [c], NG], DNT [b], potassium sulfate, graphite) **Primer [a]:** Barium nitrate, lead styphanate	**Explosives (at firing point) [a]:** NG DNT [b] **Metals (at impact areas) [a]:** Copper Iron [e] Lead Nickel

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act	MC = Munitions Constituents
CTT = Closed Transferring or Transferred	MK = Mark
DNT = Dinitrotoluene	MRS = Munitions Response Site
FUDS = Formerly Used Defense Site	NG = Nitroglycerin
ID = Identification	PWP = Programmatic Work Plan
	SI = Site Investigation

[a] Based on available technical manuals, MCs identified for the Madison Barracks Target Range FUDS munitions include primer and propellant. Primer materials typically represent a very small percentage (~5%) of the total munitions weight. The primer material, along with the propellant, typically burns as the projectile is fired, although due to the large quantity of propellant explosive residues may be deposited during firing. Therefore, the MC sampling/analysis typically focuses on primary constituents present in propellants at the firing point.

[b] DNT and DNT break-down products currently on the approved PWP (Alion 2005) explosives analysis using method 8330A list (2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3-Nitrotoluene; 4-Nitrotoluene 4-Amino-2,6-dinitrotoluene) will be analyzed.

[c] Simple single-based nitrocellulose readily breaks down in the environment and is not expected to persist while more complex nitrocellulose may persist longer in the environment (Duran et al. 1994). Nitrocellulose is not considered toxic, and consequently no risk-based screening values were developed for the compound. Furthermore, there are no chemical analysis techniques that quantify nitrocellulose separately from the natural common essential nutrient nitrate. Based on this rationale, no sampling for nitrocellulose is proposed.

[d] Shell casings would have been removed and recycled and are not likely to be present at the firing point. Therefore, no MC associated with the shell casings will be analyzed.

[e] Chemicals that are not CERCLA hazardous substances (e.g., aluminum, barium, iron) can be reported in the SI Report; however, the SI risk evaluation and conclusions will include a discussion of the limitations of the FUDS program to respond to such chemicals. Non-CERCLA chemical concentrations will not provide the basis for a RI/FS recommendation for MC in the SI report.

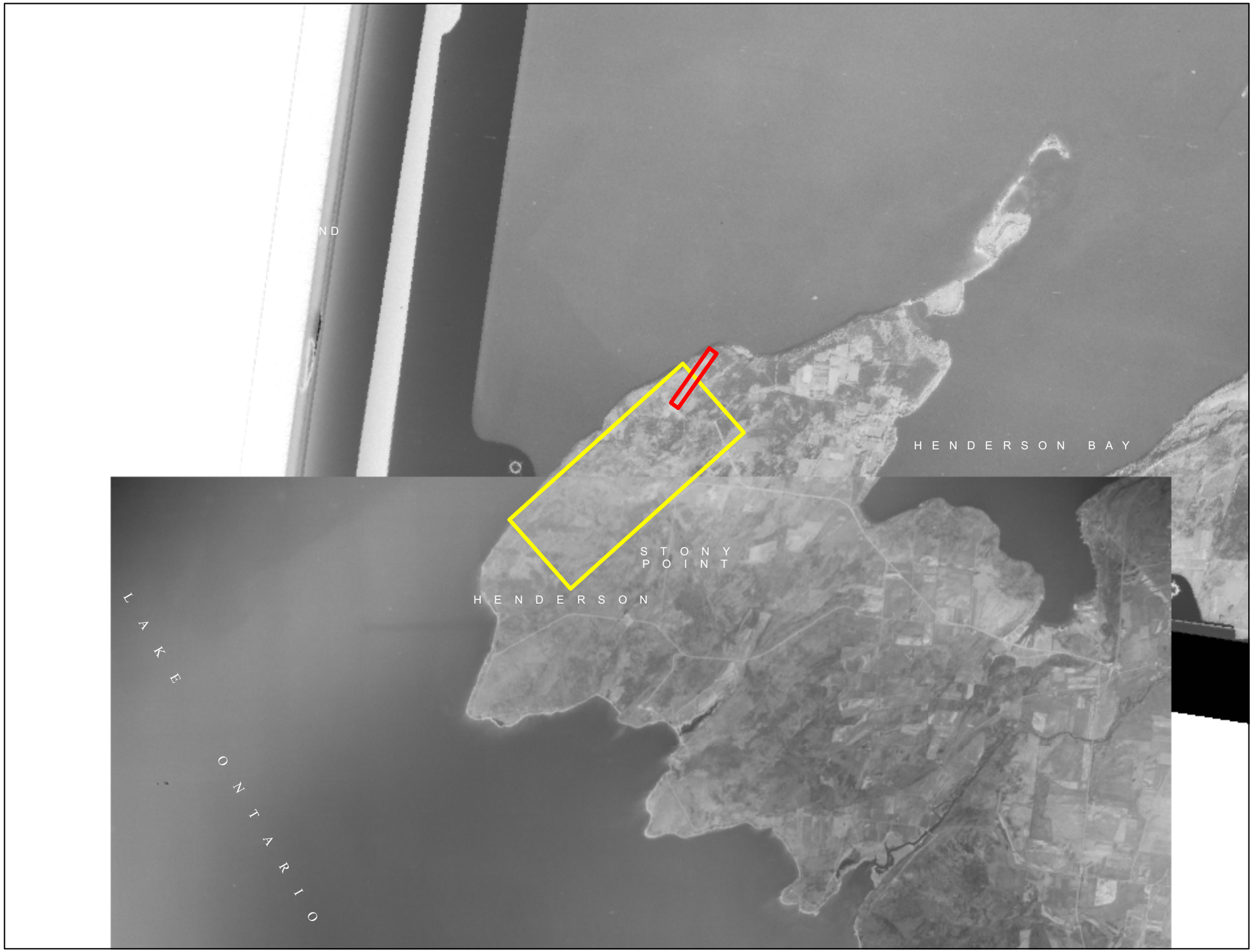
[f] Antimony is added in small quantities to the predominantly lead inner core of a bullet in order to increase the hardness of the bullet as well as to increase the melting temperature of the lead. The antimony content in a small arms inner core is typically 2-3 % of the total bullet weight with the remaining percentage being lead. Given the small quantities of antimony used, no analysis for this metal is planned. For the largest caliber gun used at Madison Barracks Target Range (.50 caliber), this represents approximately 1.3 grams of antimony. Lead and metals found in the outer jacket (copper and nickel) are the predominant environmental contaminants associated with small arms use and will serve as marker analytes for potential contamination at the impact area. If these analytes are found to exceed environmental screening levels, future studies, if implemented, should include analysis for antimony.

Table 2-3. Army Checklist for Important Ecological Places

No.	Checklist Item	Yes / No		Comments
1.	Locally important ecological place identified by the Integrated Natural Resource Management Plan, Base Realignment and Closure Act Cleanup Plan or Redevelopment Plan, or other official land management plans.		No	
2.	Critical habitat for Federally designated endangered or threatened species. See No. 12 below.		No	
3.	Marine Sanctuary		No	
4.	National Park		No	
5.	Designated Federal Wilderness Area		No	
6.	Areas identified under the Coastal Zone Management Act	Yes		Madison Barracks Target Range is located within the New York Coastal Zone (NYS DOS 2004).
7.	Sensitive Areas identified under the National Estuary Program or Near Coastal Waters Program		No	
8.	Critical areas identified under the Clean Lakes Program		No	
9.	National Monument		No	
10.	National Seashore Recreational Area		No	
11.	National Lakeshore Recreational Area		No	
12.	Habitat known to be used by Federally designated or proposed endangered or threatened species	Yes		There is one habitat within the FUDS that is federally designated endangered (Appendix L, USFWS 2009a).
13.	National preserve		No	
14.	National or State Wildlife Refuge		No	
15.	Unit of Coastal Barrier Resources System	Yes		Part of Unit DE-07P and DE-08P (USFWS 2009b)
16.	Coastal Barrier (undeveloped)		No	
17.	Federal land designated for protection of natural ecosystems		No	
18.	Administratively Proposed Federal Wilderness Area		No	
19.	Spawning areas critical for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters		No	
20.	Migratory pathways and feeding areas critical for maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which fish spend extended periods of time		No	
21.	Terrestrial areas utilized for breeding by large or dense aggregations of animals		No	
22.	National river reach designated as Recreational		No	
23.	Habitat known to be used by state designated endangered or threatened species	Yes		One Federally listed threatened species (Cork Elm) may be present within or in the vicinity of the FUDS (Appendix L, USFWS 2009a).

Table 2-3. Army Checklist for Important Ecological Places

No.	Checklist Item	Yes / No		Comments
24.	Habitat known to be used by species under review as to its Federal endangered or threatened status		No	
25.	Coastal Barrier (partially developed)		No	
26.	Federally designated Scenic or Wild River		No	
27.	State land designated for wildlife or game management		No	
28.	State-designated Scenic or Wild River		No	
29.	State-designated Natural Areas		No	
30.	Particular areas, relatively small in size, important to maintenance of unique biotic communities		No	
31.	State-designated areas for protection or maintenance of aquatic life		No	
32.	Wetlands	Yes		Wetlands have been identified within the Madison Barracks Target Range FUDS boundary (USFWS 1998).
33.	Fragile landscapes, land sensitive to degradation if vegetative habitat or cover diminishes		No	



Madison Barracks Target Range

Henderson, New York
Jefferson County

Legend

MRS 1 - Madison Barracks Training Range

Note: MRS Location is approximate based on historical aerial images

FUDS Boundary

FUDS Source: USACE (2004b)

MRS 1 boundary: Alion (2009a)

Imagery Source:
Northern Photo 1981/05/01
Southern Photo 1960/05/03

N
W E
S

Feet
0 2,500 5,000 10,000

Figure 2-1. Historic Property Layout

Madison Barracks Target Range

Henderson, New York
Jefferson County

Legend

- MRS 1 - Madison Barracks Training Range
  Note: MRS Location is approximate based on historical aerial images
- FUDS Boundary

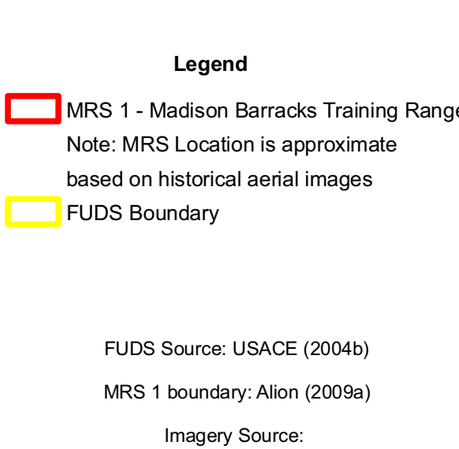
FUDS Source: USACE (2004b)

MRS 1 boundary: Alion (2009a)

Imagery Source:
ESRI iCubed
Prime World 2D Web Service

N
W E
S

Feet
0 2,500 5,000 10,000



STONY ISLAND
HOUNSFIELD
HENDERSON BAY
STONY POINT
HENDERSON
LAKE ONTARIO

Figure 2-2. Munitions Response Property Boundary and Current Aerial Imagery

Madison Barracks Target Range

Henderson, New York
Jefferson County

Legend

- MRS 1 - Madison Barracks Training Range
  Note: MRS Location is approximate based on historical aerial images
- FUDS Boundary

FUDS Source: USACE (2004b)

MRS 1 boundary: Alion (2009a)

Imagery Source:
Overview Map: ESRI NGS
Topo US 2D Web Service

N
W E
S

Feet
0 2,500 5,000 10,000

Figure 2-3. General Location of the FUDS Property and Associated MRS

Madison Barracks Target Range

Henderson, New York
Jefferson County

Legend

- FUDS Boundary
- MRS 1 - Madison Barracks Training Range
  Note: MRS Location is approximate based on historical aerial images
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

FUDS Source: USACE (2004b)

MRS 1 boundary: Alion (2009a)

Imagery Source:
Overview Map: ESRI NGS
Topo US 2D Web Service

Wetland Information: United States Department of Interior - Fish and Wildlife Service (1998)

N
W E
S

Feet
0 500 1,000 2,000

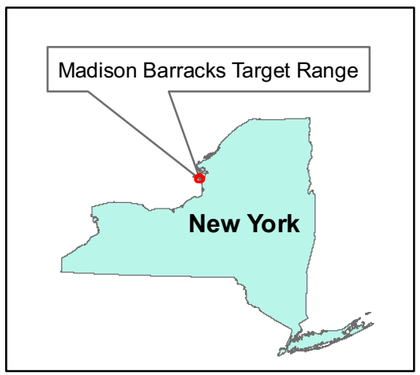


Figure 2-4. Topography and Wetlands in the vicinity of the FUDS.

3. SITE INSPECTION ACTIVITIES

3.1 Technical Project Planning

3.1.1 The first TPP Meeting for the Madison Barracks Target Range FUDS was conducted on 13 May 2009 at Robert G. Wehle State Park, Henderson, New York. Representatives from New York State Department of Environmental Conservation (NYSDEC); NYS OPRHP; CENAB; CENAN; and Alion participated in this meeting. The participants discussed the results of previous investigations, historical and current aerial photographs, the Conceptual Site Model (CSM), and Data Quality Objectives (DQOs). The Final TPP Memorandum documenting the meeting was issued in June 2009 (Alion 2009a) (Appendix B).

3.1.2 **DQO 1 – Determine if the site requires additional investigation through an RI/FS or if the site may be recommended for a No DoD Action Indicated (NDAI) designation based on the presence or absence of MEC and MC.** The basis of an RI/FS recommendation, detailed in the DQO of Appendix B, includes evaluation of evidence (e.g., historic data, field data, etc.), such as the data noted below, to make a final decision for an NDAI designation or RI/FS recommendation (e.g., presence of MD alone will not justify an RI/FS recommendation).

- Historic data that indicate the presence of MEC or MD.
- Visual evidence of MEC/MD or surface anomalies which are classified as MEC or MD.
- One or more anomalies in a target area near historic or current MEC/MD finds or within an impact crater.
- Physical evidence indicating the presence of MEC (e.g., distressed vegetation, stained soil, ground scarring, bomb craters, burial pits).

3.1.2.1 The basis for an RI/FS recommendation related to the presence/absence of MC includes:

- Maximum concentrations at the FUDS exceed USEPA Regional Screening Values based on current and future land use.
- Maximum concentrations at the FUDS exceed USEPA interim ecological risk screening values.
- Maximum concentrations at the FUDS exceed site-specific background levels.
- Data indicating the presence or absence (less than the Reporting Limit [RL]) of analytes for which no screening criteria are available are to be used to support the weight-of-evidence evaluation of MC at the FUDS.

3.1.2.2 In each of these instances, all lines of evidence (e.g., historic data, field data) are to be used to make a final recommendation for an NDAI designation or RI/FS. If none of the above scenarios occur, then a recommendation for an NDAI designation for MEC/MC is a possible option.

3.1.3 **DQO 2 – Determine the potential need for a Time Critical Removal Action (TCRA) for MEC and MC by collecting data from previous investigations/reports, conducting site visits, performing analog geophysical activities, and by collecting MC samples.** The basis for recommendations is specified below:

- A TCRA **–** If there is a complete pathway between source and receptor and if the MEC/MC and the situation are viewed as an imminent danger posed by the release or threat of a release. Cleanup or stabilization actions must be initiated within six months to reduce risk to public health or the environment.

- A non-TCRA (NTCRA) – If a release or threat of release that poses a risk where more than six months planning time is available.

3.1.3.1 In each of these instances, all lines of evidence (e.g., historic data, field data) are to be used to make a final recommendation for a TCRA or NTCRA.

3.1.4 **DQO 3 – Collect or develop additional data, as appropriate, to support potential Hazard Ranking System scoring by USEPA.**

- Verification that data were collected in accordance with the Final SS-WP in the SI Report.

3.1.5 **DQO 4 – Collect the additional data necessary to complete the MRSPP.**

- Completion of the MRSPP for the MRS with all available data and documentation of any data gaps for future annual MRSPP updates.

3.1.6 The TPP #1 meeting participants concurred with the DQOs and the general technical approach for the planned SI activities discussed during the first TPP meeting and as revised and subsequently documented in the Final SS-WP (Alion 2009b). In summary, these agreements were to inspect the MRS and conduct sampling in accordance with the Final SS-WP and complete the assessment in accordance with the DQOs. As part of this SI Report, the DQOs

presented in the SS-WP (Alion 2009b) were evaluated and a DQO attainment verification worksheet completed to document completion of the DQOs (Appendix B). All four DQOs were attained during this SI.

3.2 Supplemental Records Review

3.2.0.1 State agencies were contacted regarding threatened and endangered (T&E) species and cultural and ecological resources at the FUDS property.

3.2.1 Threatened and Endangered Species

3.2.1.1 The USFWS, NYS OPRHP, and NYSDEC, Division of Fish and Wildlife were contacted regarding the possible presence of federal and state T&E species. According to the USFWS, the federally threatened piping plover (*Charadrius melodus*) nests in the vicinity of the FUDS and the endangered Indiana Bat (*Myotis sodalis*) may be present at Madison Barracks Target Range (USFWS 2009a). According to the NYSDEC and NYS OPRHP there are several state listed significant habitats including calcareous pavement barren and calcareous shoreline outcrop at or adjacent to the MRS 1 (NYSDEC 2009a and NYS OPRHP 2009). Additionally, the state listed threatened species Cork Elm (*Ulmus Thomasii*) may occur at or adjacent to the MRS. These response letters are included in Appendix L of this SI Report. Field activities were conducted in a manner to avoid any adverse impact to any species or habitats that may be within the FUDS.

3.2.2 Cultural and Archaeological Resources

3.2.2.1 USACE contacted the NYS OPRHP to ensure cultural and archaeological resources were not present at the Madison Barracks FUDS and if present, would not be disturbed during field activities. In a response letter dated 22 October 2009, the State Historic Preservation Office (SHPO) for New York determined that no historic properties would be affected by this project (NYS OPRHP 2009) (Appendix L).

3.3 Site Inspection Fieldwork

3.3.1 Site Inspection Munitions and Explosives of Concern Field Observations

3.3.1.1 On 27 April 2010, a field team visited Madison Barracks Target Range FUDS to conduct SI field activities in accordance with the Programmatic Work Plan and the Final SS-WP (Alion 2005 and 2009b). A QR at MRS 1 was completed, including visual reconnaissance for MEC along a meandering path. A 25-foot diameter circle was cleared around each sample location using a ferrous metal geophysics detector (Whites XLT). Samples were collected from firing points and impact areas and sent them to a laboratory for analysis for possible MC

contamination. An estimated 1.9 acres of land were assessed during the field work using visual QR at the FUDS, and an additional 0.08 acres of land was assessed conducting QR around sample locations.

3.3.1.2 **MRS 1 – Madison Barracks Target Range:** Site reconnaissance findings, MRS 1 sample locations, and background sample locations are shown on Figure 3-1. A photograph log is included in Appendix E, and the photograph locations are shown on Figure 3-2. Area observations are presented below.

- The small arms range (MRS 1) is undeveloped with sparse vegetation; however, the berm (impact area) was heavily vegetated. There are no residents within the MRS boundary and the property is used for recreational activities. There are no barriers to prevent the public from entering the FUDS.
- No MEC was observed during the field event; however, numerous expended bullet slugs (MD) were observed at the small arms range berm. Additionally, seven subsurface anomalies were recorded in this area.
- Samples at the berm impact area (MBTR-MR1-SS-01 through MBTR-MR1-SS-01-05) were relocated slightly to a location with the highest concentration of observed surface MD (expended bullet slugs) (Photos E.10 and E.11, Appendix E).
- No MEC or MD was observed in the vicinity of the six pill boxes. Four of the pill boxes are on the shoreline and two are inland.

3.3.2 Site Inspection – Munitions Constituents Samples Collected

3.3.2.1 **MRS 1 – Madison Barracks Target Range:** Seven surface soil (MBTR-MR1-SS-01-01 through and MBTR-MR1-SS-01-07) samples were collected. The samples collected at the firing points were analyzed for NG, DNT and DNT breakdown products (see Table 2-2) and the samples collected at the impact area were analyzed for copper, iron, lead, and nickel.

3.3.2.3 **Background Samples:** As presented in the Final SS-WP (Alion 2009b), five background surface soil samples were collected outside MRS 1 boundary, three within the FUDS and two outside the FUDS boundary (Figure 3-1). All background soil samples were analyzed for select metals only (copper, iron, lead, and nickel).

3.3.2.4 As-collected sample locations, sample designations, sampling rationale, and field observations are summarized in Table 3-1. Sampling locations are depicted on Figure 3-1. Additional information pertaining to the field activities, including field notes, forms, and chain of custodies, are provided in Appendix D. A photo documentation log from the SI is included in

Appendix E and photo locations are shown on Figure 3-2. The summary of sample detections that exceeded a screening level are shown on Figure 3-3. A MEC screening level risk assessment and reconnaissance findings are discussed in Section 4. MC sample results are discussed in detail in Section 5.

3.4 Work Plan Deviations and Field Determinations

3.4.1 Deviations from the Final SS-WP (Alion 2009b) occurred with respect to sample locations. Samples were moved slightly due to the site conditions (e.g., change in site conditions, topography, inaccessibility due to presence of vegetation) and to areas where sampling media were present in adequate quantities for sampling. These deviations were minor in nature and did not affect the quality of data collected. Refer to the DQO Verification Worksheet included in Appendix B.

3.5 Site Inspection Laboratory Data Quality Indicators

3.5.1 This section summarizes the data quality assessment for the Madison Barracks Target Range SI analytical data. Data were generated by TestAmerica under the 2006 DoD Quality Systems Manual (QSM) Version III (DoD 2006) and validated by a third-party validator (EDS) using USEPA Region II Functional Guidelines. The detailed TestAmerica and EDS reports are contained in Appendices F and G, respectively. The data were also analyzed using the Automated Data Review Version 8.1 based on the DoD QSM Version III guidelines, and these results are included in the Environmental Data Management System (EDMS) database. Data Quality Indicators (DQIs) include precision, accuracy, representativeness, completeness, and comparability as well as sensitivity. At Madison Barracks Target Range, no quality assurance (QA) split samples were collected in accordance with USACE direction. Therefore, the USACE Memorandum for Record-Chemical Quality Assurance Report of Quality Assurance Split Samples is not applicable to this Draft SI Report. However, CENAB will provide a Chemical Data Quality Assessment Report (CDQAR) for inclusion in Appendix G of the Final SI Report.

3.5.2 Precision is a measure of the reproducibility of repetitive measurements of the same process under similar conditions. Precision is determined by measuring the agreement among individual measurements of the same property, under similar conditions, and is calculated as an absolute value. The degree of agreement was expressed as the relative percent difference between the separate measurements (usually matrix spike/matrix spike duplicate [MS/MSD] pairs) and the observed relative percent difference compared to acceptable values. Any differences between MS/MSD pairs for the Madison Barracks Target Range data were examined and any affected sample results qualified as discussed in the Region II Functional Guidelines.

The majority of the MS/MSD samples achieved acceptable values, however, several samples required qualifiers and these were qualified appropriately (Appendix G). Field precision is measured by the comparison of field duplicate samples to their associated parent samples. A discussion of this comparison is presented in the CDQAR which is provided by the USACE and is included in Appendix G of the Draft Final SI Report. The precision DQI was met.

3.5.3 Accuracy is the degree of agreement of a measurement with an accepted reference or true value. Accuracy measures the bias or systematic error of the entire data collection process. To determine accuracy, a sample that has been spiked with a known concentration is analyzed by the laboratory as the MS, MSD, surrogate and blank spikes, or Laboratory Control Spike. EDS assessed accuracy according to Region II Functional Guidelines and assigned qualifiers as appropriate. The accuracy DQI was met (Appendix G).

3.5.4 Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is achieved through proper development of the field sampling program during the TPP and work plan development. Deviations from the Final SS-WP were minor: sample locations were moved slightly due to site-specific conditions. The samples were collected and analyzed as proposed; therefore the representative DQI was achieved for the Madison Barracks Target Range FUDS.

3.5.5 Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. Data are complete and valid if the data achieve all acceptance criteria including accuracy, precision, and any other criteria specified by the particular analytical method being used. None of the 80 total analyte results associated with the Madison Barracks Target Range SI sampling effort were rejected; therefore, the completeness indicator is 100 percent. The Madison Barracks Target Range data met the completeness DQI.

3.5.6 Comparability expresses the confidence with which one data set can be compared to another. The comparability DQI was evaluated with respect to the comparability of sampling results within the data set based on analytical and data validation procedures prescribed in the DQOs. Standard methods for sampling and analyses were followed as documented in the SS-WP; therefore, the comparability DQI was achieved.

3.5.7 Sensitivity is a measure of the screening criteria as they compare to detection limits. If screening criteria are below detection limits (i.e., RL), the certainty of the “non-detected” data to

indicate that MCs are present at levels at which no unacceptable risks may occur is called into question. The laboratory reported to the RL, which represents the lowest concentration at which calibration standards were assessed. Consequently, if sensitivity Measurement Quality Objectives (MQOs) were achieved for MCs, the RLs are adequate to detect risks at levels of concern for the identified receptor. In this instance, non-detected data sufficiently indicates that no unacceptable risk to receptors is present from the sample or group of samples. The sensitivity MQO was achieved for analyte/receptor/matrix combinations with the exception of NG in soil. The RL for NG in soil is higher than the human health screening level. In addition, no ecological screening values were available for iron or NG in surface soil. Uncertainties associated with the cases in which the MQO for sensitivity was not met, and the absence of a screening value, are discussed within the context of analytical sample results in Section 5.

3.6 Second Technical Project Planning Meeting

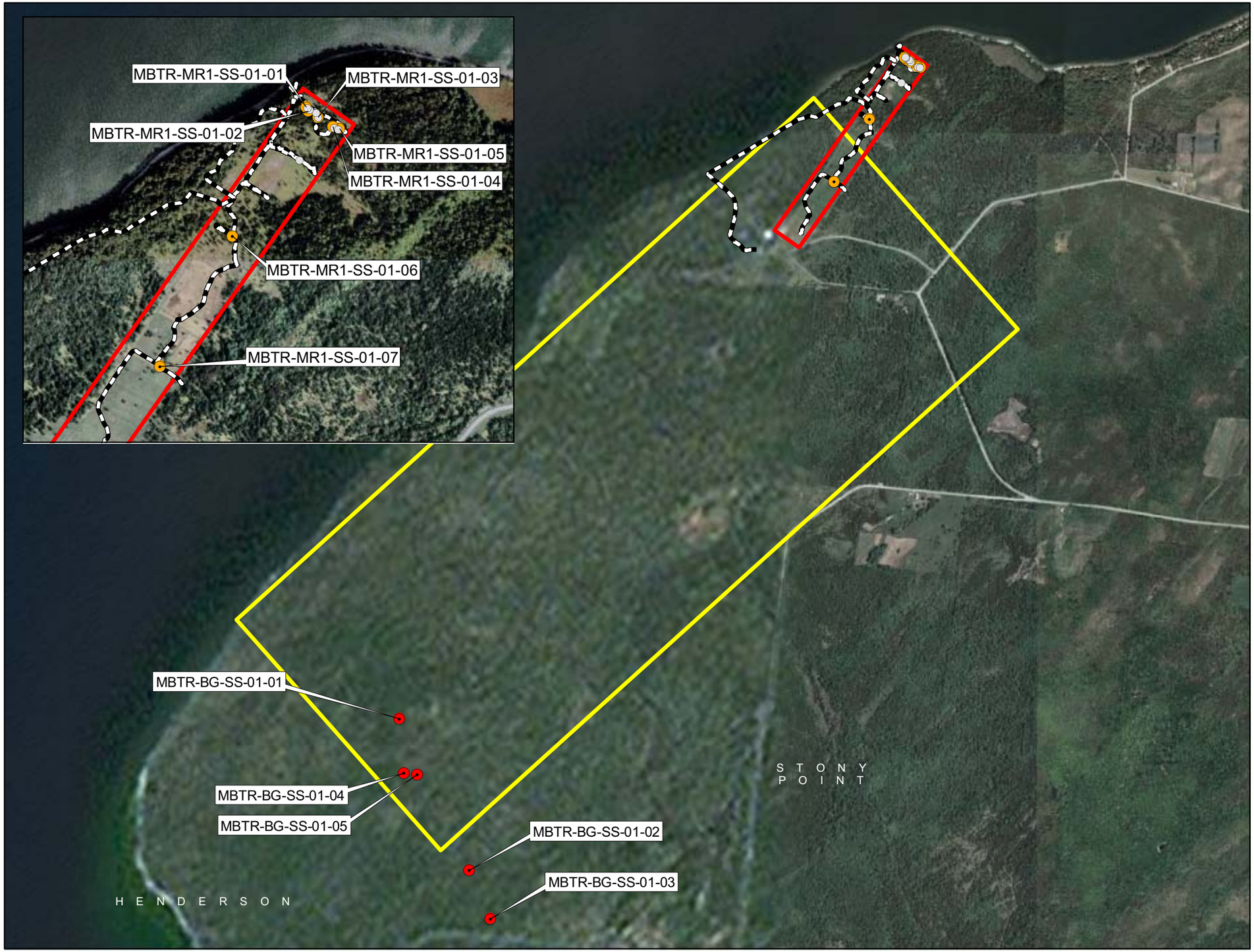
3.6.1 Following the completion of the Draft Final SI Report, stakeholders participated in a second TPP meeting via teleconference on December 15, 2010 to discuss the findings, conclusions, and recommendations of the Draft Final SI Report; review the MRSPP (Appendix K); and confirm that the project objectives and DQOs were achieved (Alion 2009a and 2009b). The TPP #2 memorandum summarizing this meeting is provided in Appendix B.

Table 3-1. Madison Barracks Target Range Proposed Sample Locations and Descriptions

Location	Sampling ID	Coordinate System: UTM Zone: 18N Datum: NAD 1983 CONUS		Area of Interest / Rationale of Sampling Locations
		Easting(m)	Northing(m)	
MRS 1 (Madison Barracks Target Range)	MBTR-MR1-SS-01-01	398665.35	4859415.08	Surface soil sample located at berm impact area (select metals)
	MBTR-MR1-SS-01-02	398670.03	4859407.80	Surface soil sample located at berm impact area (select metals)
	MBTR-MR1-SS-01-03	398687.29	4859396.88	Surface soil sample located at berm impact area (select metals)
	MBTR-MR1-SS-01-04	398714.70	4859379.70	Surface soil sample located at berm impact area (select metals)
	MBTR-MR1-SS-01-05	398727.44	4859375.97	Surface soil sample located at berm impact area (select metals)
	MBTR-MR1-SS-01-06	398530.22	4859178.58	Surface soil sample located at firing point (select metals and select explosives)
	MBTR-MR1-SS-01-07	398396.65	4858939.49	Surface soil sample located at firing point (select metals and select explosives)
Background Soil	MBTR-BG-SS-01-01	396734.57	4856887.22	Background for metals comparison collected in the southeastern boundary of the FUDS.
	MBTR-BG-SS-01-02	397001.20	4856308.34	Background for metals comparison collected just outside the southeastern boundary of the FUDS.
	MBTR-BG-SS-01-03	397082.95	4856121.71	Background for metals comparison collected just outside the southeastern boundary of the FUDS.
	MBTR-BG-SS-01-04	396753.66	4856679.45	Background for metals comparison collected in the southeastern boundary of the FUDS.
	MBTR-BG-SS-01-05	396802.55	4856672.94	Background for metals comparison collected in the southeastern boundary of the FUDS.

Note: See Table 2-2 for specific MC related analyses associated with each area.

BG = Background
CONUS = Continental United States
ID = Identification
MR/ MRS = Munitions Response Site
MBTR = Madison Barracks Target Range
MC = Munitions Constituents
NAD = North American Datum
SS = Surface Soil Sample
UTM = Universal Transverse Mercator



Madison Barracks Target Range

Henderson, New York
Jefferson County

Legend

- Anomaly
- Surface Soil Sample
- Background Surface Soil Sample
- Transect
- MRS 1 - Madison Barracks Training Range
- Note: MRS Location is approximate based on historical aerial images
- FUDS Boundary

FUDS Source: USACE (2004b)

MRS 1 boundary: Alion (2009a)

Imagery Source:
ESRI iCubed
Prime World 2D Web Service

N
W E
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0 750 1,500 3,000 Feet

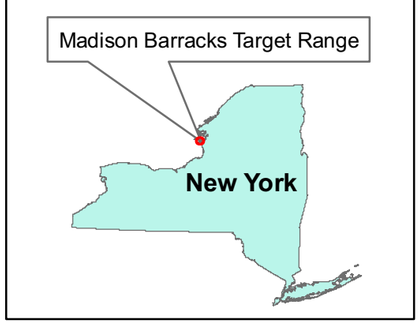


Figure 3-1. Sample Locations and Geophysical Reconnaissance Findings.

Madison Barracks Target Range

Henderson, New York
Jefferson County

Legend

- Photo Locations
- MRS 1 - Madison Barracks Training Range
  Note: MRS Location is approximate based on historical aerial images
- FUDS Boundary

FUDS Source: USACE (2004b)

MRS 1 boundary: Alion (2009a)

Imagery Source:
ESRI iCubed
Prime World 2D Web Service

N W E S

0 750 1,500 3,000 Feet

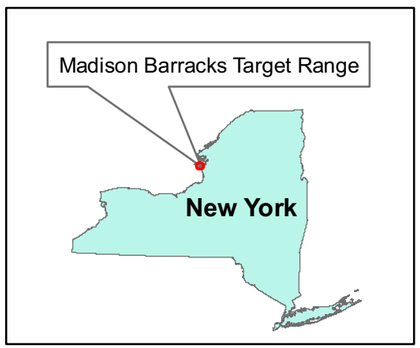
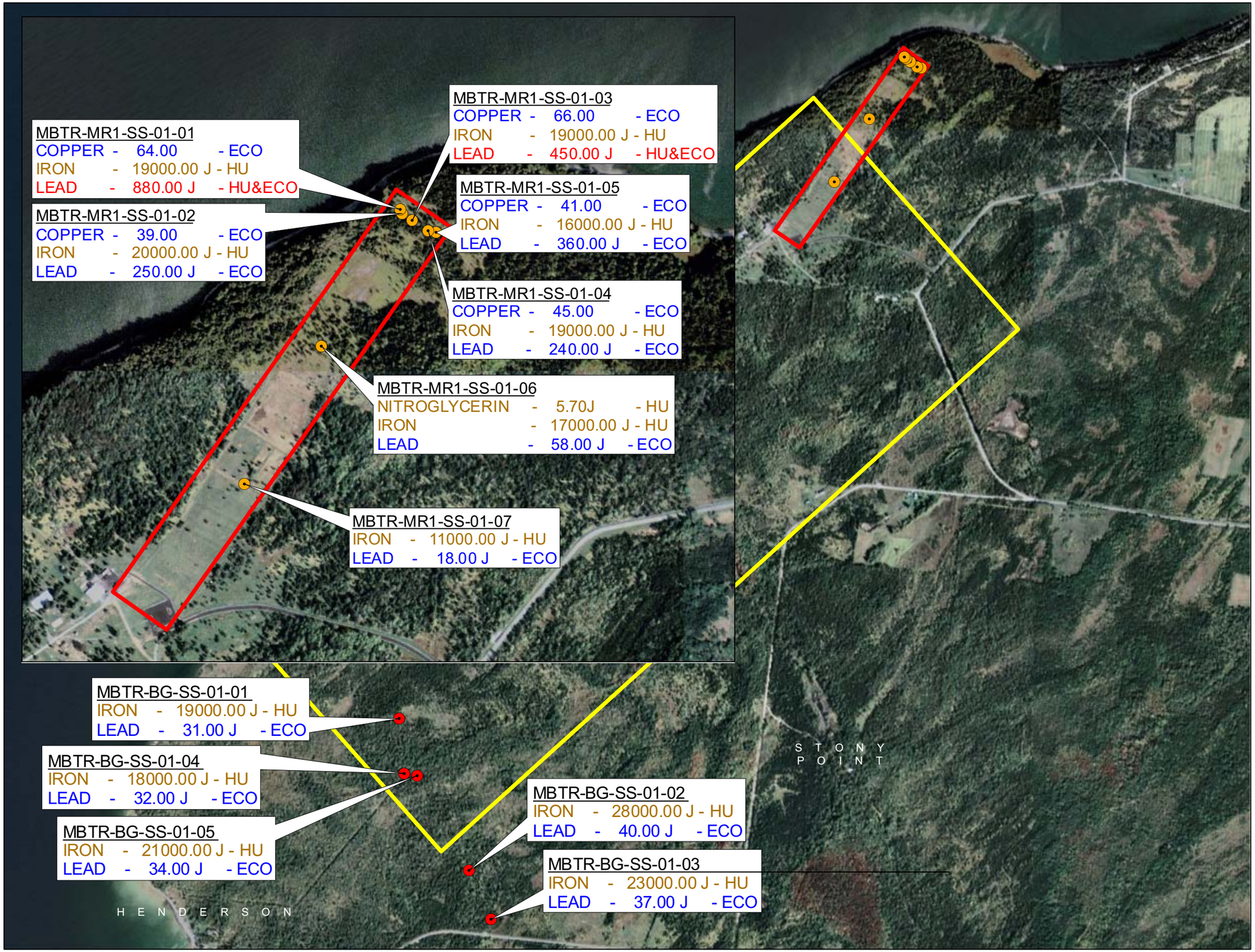


Figure 3-2. Photo Locations



Madison Barracks Target Range

Henderson, New York
Jefferson County

Legend

- Surface Soil Sample
- Background Surface Soil Sample
- MRS 1 - Madison Barracks Training Range
  Note: MRS Location is approximate based on historical aerial images
- FUDS Boundary

FUDS Source: USACE (2004b)

MRS 1 boundary: Alion (2009a)

Imagery Source:
ESRI iCubed
Prime World 2D Web Service

ECO- Exceeds ecological risk screening value

HU- Exceeds human health risk screening value

HU & ECO- Exceeds both ecological and human health risk screening value

N
W E
S

0 750 1,500 3,000 Feet

Figure 3-3. Sample Exceedances.

4. MUNITIONS AND EXPLOSIVES OF CONCERN SCREENING LEVEL RISK ASSESSMENT

4.1 Munitions and Explosives of Concern Risk Assessment

4.1.1 A qualitative MEC screening level risk assessment was conducted based on the SI QR, as well as historical data documented in the INPR and INPR Supplement and information obtained from the current property owners (USACE 1991 and 2004b). A qualitative risk evaluation assesses the potential explosive safety risk at the FUDS and communicates the hazard that may exist at the FUDS and the potential causes of this hazard (USAESCH 2001).

4.1.2 An explosive safety risk is the probability for an MEC item to detonate and potentially cause harm as a result of human activities. An explosive safety risk exists if a person can come near or in contact with MEC and act on it to cause a detonation. The potential for an explosive safety risk depends on the presence of three elements (USAESCH 2001).

- Ordnance and Explosive Factors - a source (presence of MEC)
- Site Characteristics Factors – accessibility and stability
- Human Factors – a receptor (person) and interaction (e.g., touching or picking up an item).

4.1.3 Each of these primary risk factors was used to evaluate the field and historic data to generate an overall hazard assessment rating of either low, moderate, or high (Table 4-1). The CSM for MRS 1 reflects this MEC assessment strategy (Appendix J).

4.1.4 The MEC source is based on the MEC type, sensitivity, density and depth distribution (Table 4-1). The type of MEC dictates the likelihood and severity of exposure, and thereby injury, if the MEC functions when encountered. MEC sensitivity affects the likelihood of a MEC item functioning as designed when encountered by a receptor (e.g., pressure from stepping on the item, fuze activation from moving the item, etc.). MEC quantity/density and depth, if present, are generally unknown during the SI and are evaluated during follow on studies (RI/FS).

4.1.5 Site characteristics refer to the physical conditions of the site and natural events that occur at a site (Table 4-1). Site accessibility affects the likelihood of a receptor coming in contact with MEC and include man-made (e.g., walls or fences) or natural barriers (e.g., terrain, topography, vegetation) that may prevent access to the site. A MEC item tends to remain in place unless

disturbed through human or natural forces (e.g., frost heaving, erosion, tidal or wave action). If MEC movement occurs, the probability of direct human contact may increase, but not necessarily result in direct contact or exposure.

4.1.6 Human interaction includes the type of activities that exist at the site, the human population that may have access, and the frequency of that access (Table 4-1). Activities are generally classified as recreational (hiking, camping, etc.) and occupational (farming, industrial, etc.). Activities at a site generate an exposure route for a MEC receptor. The MEC exposure route is typically direct contact with a MEC item on the surface or through subsurface activities (e.g., digging during construction). The area population and frequency of use determines the likelihood of a receptor to encounter MEC. The risk to the surrounding population is based on site characteristics and location, access restrictions, natural and/or man-made barriers, and the surrounding population.

4.1.7 Based on the risk criteria delineated above, a site is qualitatively assigned a low, moderate, or high MEC hazard ranking. The MEC risk assessment categories are defined below in Table 4-1.

Table 4-1. MEC Risk Assessment Categories

MEC Risk	MEC Type	MEC Sensitivity	Site Access	Site Stability	Human Interactions
High	MEC that will cause an individual's death if detonated by an individual's activities	Very sensitive - Handling or movement may cause detonation	No Restriction - No man-made or natural barriers (e.g., no fence, gentle sloping terrain, no vegetation, no water) that restrict access	Site Unstable - MEC most likely will be exposed by natural events	High potential for and frequency of contact (e.g., general public has open and frequent access, high potential for surface/subsurface intrusive activity)
Moderate	MEC that will cause major injury to an individual if detonated by an individual's activities	Less sensitive - Fuzed but may be moved safely if identified as such by a UXO Technician	Limited Restriction - Man-made barriers and/or natural barrier (e.g., dense vegetation, water, snow or ice cover, and/or terrain) that restrict access	Moderately Stable - MEC may be exposed by natural events	Moderate potential for and frequency of contact (e.g., a limited number of the general public has open and somewhat frequent access, few site uses, surface/subsurface intrusive activity possible)
Low	MEC that will cause minor injury to an individual if detonated by an individual's activities	May have functioned correctly or is unfuzed but has a residual risk	Restricted Access- All points of entry are controlled (man-made and/or natural barriers present)	Stable Site - MEC should not be exposed by natural events	Low potential for and frequency of contact (e.g., no general public access, infrequent site access primarily by site personnel, no

Table 4-1. MEC Risk Assessment Categories

MEC Risk	MEC Type	MEC Sensitivity	Site Access	Site Stability	Human Interactions
					subsurface activity)
None	Inert MEC or scrap (MD), will cause no injury	Inert MEC or scrap (MD), will cause no injury	-	-	-

4.2 Munitions and Explosives of Concern Hazard Assessment

4.2.1 MRS 1 – Madison Barracks Target Range

4.2.1.1 Table 4-2 was completed based on observations contained in historical documents and observations from the SI field event.

Table 4-2. MRS 1 – Madison Barracks Target Range Hazard Impact Assessment

	Historical Observations	Site Inspection Observations	Qualitative Site Hazard
MEC Type and Sensitivity			
Munitions Type	Munitions used included small arms, (.30 caliber, .45 caliber, .38 caliber, .50 caliber) (Table 2-1). No MEC/MD was reported found at the MRS since site closure.	No MEC observed during SI field event; however, numerous expended bullets (.22 caliber, .30 caliber, .45 caliber, .38 caliber, .50 caliber) were observed at the berm impact area.	Low
MEC Sensitivity	None	None	None
Site Access and Stability			
Accessibility	No manmade barrier	No manmade barriers. MRS 1 is part of Wehle State Park.	High
Site Stability	Low	Moderate – beach area of the MRS is mostly rocky and slightly reworked by the natural weather patterns.	Low
Human Interaction			
Population, Frequency of Use, Types of Activities	No documented injuries. MRS 1 was used for small arms training.	Visitor/trespassers, construction workers, and employees have access to MRS 1. There are less than 26 inhabited structures in the vicinity of MRS 1.	Low
Overall Site Hazard Ranking	Low Hazard		

FUDS – Formerly Used Defense Site
MD – Munitions Debris
MEC – Munitions of Explosive Concern
MRS – Munitions Response Site

4.3 Madison Barracks Target Range FUDS MEC Hazard Summary

4.3.1 Table 4-2 summarizes the qualitative MEC hazard at MRS 1 at the Madison Barracks Target Range FUDS. MRS 1 is frequently accessed by the public, especially seasonally, since it is within a State Park. As a result, the Site Access has been rated as high, while the Stability category was rated as low hazard. However, no MEC items have reportedly been found at MRS 1 and none were observed during the 2010 SI field activities. Based on this qualitative MEC risk evaluation, the hazard to human receptors via contact with MEC at MRS of the FUDS is low. Further evaluation of potential MEC at this FUDS is not recommended.

5. MUNITIONS CONSTITUENTS SAMPLING AND ANALYSIS

5.0.1 A screening level human health risk assessment (HHRA) and screening level ecological risk assessment (SLERA) were conducted to determine whether MCs in environmental media at Madison Barracks Target Range may warrant a more detailed assessment of potential risk to current or future human and ecological receptors. The screening methodology, CSM, analytical results for the MC sampling, and results of the screening assessment are presented below.

5.1 Data Evaluation Methodology

5.1.0.1 The following sections present the process used to evaluate the MC data collected for the Madison Barracks FUDS. The methodology is designed to evaluate data for relevant MCs in the HHRA and SLERA using the appropriate risk-based screening criteria. The methodology also provides a means to evaluate uncertainty in the screening HHRA and SLERA process and provide context for the risk conclusions. This process is consistent with the decision rules outlined in Section 3.1 (TPP) of this report, and is described in more detail in the following sections.

5.1.1 Refinement of Munitions Constituents

5.1.1.1 During the SI process, MCs potentially associated with the Madison Barracks Target Range were evaluated. MCs were identified based on knowledge of munitions historically used at the FUDS. Information on historic use was obtained from munitions data sheets, historical documents, and other munitions reference documents.

5.1.1.2 The list of MCs for evaluation for the single MRS identified at the Madison Barracks FUDS is provided below and presented in further detail in Table 2-2. The associated MC analysis is based on the munitions used and potentially remaining at the MRS.

Madison Barracks Training Range (MRS 1)

- Explosives (DNT and DNT breakdown products {see Table 2-2}, and NG)
- Metals (copper, iron[1], lead, and nickel).

[1] Iron is not classified as a hazardous substance under CERCLA. As per USACE guidance regarding non-CERCLA hazardous substances the screening results for this metal will not be used as the sole basis for determining a RI/FS recommendation for the site.

5.1.2 Data Quality

5.1.2.1 Only validated data were used in the screening process. The validated data were obtained from the following samples:

1. Seven surface soil samples (collected 0-6 inches bgs)
2. Two duplicate[2] surface soil samples
3. Five background surface soil samples

5.1.2.2 The first step in the risk assessment screening process was the evaluation of the analytical data. Inclusion or exclusion of data on the basis of analytical qualifiers was performed in accordance with USEPA guidance (USEPA 1989). The following provides a list of the qualifiers used in the validated analytical dataset and their treatment in the risk assessment:

- Analytical results bearing the U qualifier (indicating that the analyte was not detected at the given detection limit) were retained in the dataset. The RL was used for non-detected samples.

- Analytical results bearing the J qualifier (indicating that the reported value was estimated) were retained in the dataset. The estimated concentration provided by the laboratory was used for each sample.

5.1.3 Screening Values

5.1.3.1 Screening concentrations were used in the HHRA and SLERA to support risk-based conclusions and recommendations regarding the FUDS property. Maximum property concentrations for relevant MCs were compared to the risk-based concentrations as part of the selection process for chemicals of potential concern (COPCs) and chemicals of potential environmental concern (COPECs).

5.1.3.2 For the HHRA USEPA regional screening levels (SLs) for residential and industrial soil were selected as the basis of the screening criteria to select COPCs (USEPA 2010a). The SLs are referred to as “regional SLs” throughout the remainder of this section. The regional SLs are developed from toxicity values and standard exposure factors to estimate contaminant concentrations that are protective of humans, including sensitive subgroups, over a lifetime.

[2] Duplicate samples were treated as discrete samples; duplicates were not averaged for the purpose of this risk screening

5.1.3.3 The regional SLs for residential and industrial soils consider exposures through direct contact (e.g., ingestion, dermal contact, and inhalation of particulates and vapors) and are inclusive of a subset of the exposure pathways identified for MCs in the SS-WP Addendum (specifically incidental ingestion and dermal contact) (Alion 2009b) that could occur at the FUDS (i.e., potentially complete pathways). Indirect exposures, including ingestion of plants and animals exposed to MCs in soil are also identified as potentially complete pathways for human receptors to soils, however these indirect pathways are anticipated to result in significantly lower exposures compared to those described above in which humans come into direct contact with soil. Therefore, the regional SLs for residential and industrial soils are determined to be appropriate screening tools for surface and subsurface soils for the HHRA.

5.1.3.4 In some cases, SLs are based on the toxicity, or relative toxicity of related compounds. The regional SLs for 2-amino-4,6-DNT and 4-amino-2,6-DNT are based on toxicity information for 2,4-DNT. Because the amino-DNT isomers may behave differently from 2,4-DNT, the use of the regional SLs for these MCs may result in some uncertainty in the risk assessment.

5.1.3.5 The regional SLs for direct contact with soil correspond to typical risk thresholds of a one-in-one million (1E-06) cancer risk or a non-carcinogenic hazard quotient (HQ) of 1.0. The HHRA screening levels for explosives 2,4-DNT, 2-nitrotoluene, and 4-nitrotoluene are based on carcinogenic endpoints. The HHRA screening levels for the explosives 2,6-DNT, 2-amino-4,6-DNT, 3-nitrotoluene, 4-amino-2,6-DNT, NG; and the metals copper, iron, lead, and nickel are based on non-carcinogenic endpoints. The toxicological endpoint for all of these non-carcinogenic MCs is not the same. Rather these MCs act at various different target organs including the spleen, kidney, GI, and liver (USEPA 20010b, USEPA 1997).

5.1.3.6 As discussed in the SS-WP Addendum (Alion 2009b), the screening levels derived from non-carcinogenic endpoints were divided by ten to provide a means to account for potential occurrence of adverse non-carcinogenic health effects due to exposure to multiple non-carcinogens. The exception to the adjustments described is for lead. In the case of lead, regional SLs for soil are based on a blood lead level rather than a chronic daily intake, as is used for other non-carcinogens and, therefore, no adjustments were made to the lead regional SLs for use in evaluating soils. The adjustments to the screening values described are consistent with previous HHRAs completed under this program. The adjustments to the screening values described are consistent with previous HHRAs completed under this program.

5.1.3.7 All of the MCs evaluated had screening values available for application in the HHRA.

The application of HHRA screening values is described in Sections 5.1.3.12 and 5.1.3.13. Results of the HHRA are discussed in Section 5.4, and are presented in Table 5-1.

5.1.3.8 Screening for ecological-based COPECs was conducted by calculating an HQ, which represents the ratio of the maximum detected chemical concentration in an environmental medium to a medium-specific ecological screening level. Screening levels derived from studies in specific media and environmentally similar conditions to those at the FUDS are the most relevant and appropriate for screening. In cases where screening values derived from environmentally-specific testing environments are not available, alternative screening values may offer a sufficient screening tool.

5.1.3.9 Ecological soil screening levels (eco-SSLs) were used to screen for COPECs in soil. Eco-SSLs are screening level benchmark concentrations for contaminants in soil that have been determined to be protective of terrestrial-based ecological receptors that commonly come into contact with soil, or ingest biota that live in, or on, the soil. These benchmark concentrations are generally used for screening level purposes to identify COPECs in upland soils that may require further evaluation. Eco-SSLs are derived using information on toxicity and estimated ingestion exposure doses for terrestrial-based ecological receptors. As described in the SS-WP Addendum CSM diagram for the Madison Barracks FUDS, potentially complete pathways for ecological receptors to surface soils at the FUDS are incidental ingestion of and dermal contact with MCs in soil, and ingestion of vegetation and game exposed to MCs in surface soil. USEPA guidance (USEPA 2005a) states that the dermal pathway is generally less significant compared to ingestion, and does not warrant inclusion in the derivation of eco-SSLs. Therefore, the eco-SSLs derived using exposure assumptions for ingestion only are determined to be adequate for the purposes of the SLERA.

5.1.3.10 For the soil screening, eco-SSLs developed by USEPA were adopted for screening the metals copper, lead, and nickel. No eco-SSLs were available from USEPA for any of the explosives being evaluated, or for the metal iron. Consistent with previous SLERAs completed under this program, screening values were obtained from Talmage et al. (1999) for 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoulene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene. No eco-SSLs, or appropriate alternative screening values, were available for NG or iron.

5.1.3.11 In some cases eco-SSLs are based on the toxicity or relative toxicity of related compounds. The eco-SSL of 30 mg/kg for 2,4-DNT, 2,6-DNT, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene is based on toxicity data for 2,4,6-TNT. There is no conclusive evidence

regarding the dominant process by which 2,4,6-TNT is reduced in soil. One study indicated that bacterial degradation of 2,4,6-TNT to 2- and 4-amino-DNT occurs under aerobic and anaerobic conditions (Vorbeck et al. 1998). An *in vitro* study completed in a *Pseudomonas bacterium* species suggests that 2,4,6-TNT breaks down to 2,4-DNT (Haidour and Ramos 1996). Laboratory studies support the observations of Haidour and Ramos (1996) that bacteria strains can generate 2,4-DNT from TNT (Martin et al. 1997). These findings provide some support for the use of TNT as a surrogate for DNT and DNT breakdown products. In addition, the soil eco-SL of 80 mg/kg for 4-amino-2,6-DNT is based on data for the chemical isomer 2-amino-4,6-DNT. There is some uncertainty associated with adopting surrogate screening values for these MCs from 2,4,6-TNT and 2-amino-4,6-DNT. In addition, some screening values are based on limited data. The eco-SSL for 2-amino-4,6-DNT was derived using data from a single study in plants. The application of the ecological screening values is described in Sections 5.1.3.12 and 5.1.3.14. Results of the SLERA are discussed in Section 5.4, and are presented in Table 5-1.

5.1.3.12 In accordance with USEPA Guidance, the following screening process is utilized.

1. The maximum concentration of each chemical detected in each medium is identified.

2. If a chemical was detected in at least one sample in a specific medium, it is retained for consideration in the screening of COPCs/COPECs.

3. If the concentration of a specific chemical exceeds its screening value and is above the maximum and/or mean background concentration, the chemical is retained as a COPC/COPEC.

4. If a screening concentration is not available for a specific chemical in a particular medium, the screening concentration for a structurally similar compound is used, if warranted. The screening tables list any surrogates that are used.

5. An analyte is eliminated from the list of COPCs/COPECs if it is an essential nutrient of low toxicity, and its reported maximum concentration is unlikely to be associated with adverse health impacts.

5.1.3.13 For the HHRA, the maximum detected concentrations for each detected MC was compared to the screening criteria determined for use in the HHRA. If the maximum concentration was less than the screening value(s), the target analyte was eliminated from

consideration. If the maximum concentration exceeded the screening value, the analyte was retained as a COPC.

5.1.3.14 Under the SLERA, an HQ analysis was completed for each detected analyte. An HQ is defined as the measured concentration divided by the screening criteria. If the maximum concentration was less than the screening value (HQ < 1.0), the analyte was eliminated from consideration as a COPEC. If the maximum concentration exceeded the screening value (HQ > 1.0), the analyte was retained as a COPEC.

5.1.3.15 For both the HHRA and SLERA, in cases in which no screening criteria are available, any available information regarding the potential for the MCs to present a risk to receptors is presented.

5.1.4 Comparison of Screening Levels with Detection Limits for Never-Detected Analytes

5.1.4.1 The usability of the analytical data for making conclusions regarding risk was evaluated by comparing the RLs for samples that were never detected to their respective screening values used for human health (Table 5-2) and ecological (Table 5-3) risk screening. If a chemical was never detected, but the RL was higher than the screening value, then the MQO for sensitivity was not met. Such non-detects are not usable for determining whether contamination is greater or less than the detection limit (i.e., RL). Where no screening values are available, no conclusions can be drawn regarding the adequacy of the RLs for screening risk, and as a result, uncertainty is introduced into the risk assessment. In these instances, a weight-of-evidence approach is used in making risk-based decisions. The weight-of-evidence (WOE) approach used in the absence of screening values includes an assessment of the fate and transport of the chemical, and the frequency of detection of MCs that are likely to have been co-derived from a munitions source.

5.1.4.2 Table 5-2 shows a comparison of the RLs and human health screening values for all analytes never detected in surface soil at MRS 1. With the exception of NG, all of the explosives analyzed were never detected above their respective RLs. The RLs for all of the never-detected explosives were lower than the respective soil screening criteria adopted for the HHRA.

5.1.4.3 As described in Section 5.1.3.6, the regional SLs for 2-amino-4,6-DNT and 4-amino-2,6-DNT are based on toxicity data for 2,4-DNT. The maximum RLs in soil of 0.1 mg/kg for the two amino-DNT isomers is well below the screening criteria developed from regional SLs for use in the HHRA (15 and 200 mg/kg for 2-amino-4,6-DNT; 15 and 190 mg/kg for 4-amino-2,6-DNT). Any uncertainties in the application of these screening levels to the risk assessment are, therefore, determined not to be significant for the HHRA.

5.1.4.4 Table 5-3 shows a comparison of the RLs and ecological screening values for analytes never detected in surface soil at MRS 1. With the exception of NG, all of the explosives analyzed were never detected above their respective RLs. The RLs for all never-detected explosives for which eco-SSLs were available were lower than the respective screening criteria adopted for the SLERA.

5.1.4.5 As described in Section 5.1.3.9, the adoption of screening values from surrogates introduces some uncertainty into the risk assessment. The eco-SSL for 2,4,6-TNT was adopted for 2,4-DNT, 2,6-DNT, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene. The maximum RLs of 0.1 mg/kg for 2,4-DNT, and 2,6-DNT, and 0.2 mg/kg for 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are all well below the eco-SSL of 30 mg/kg adopted for these MCs in the SLERA. In addition, the eco-SSL for 2-amino-4,6-DNT was adopted for 4-amino-2,6-DNT. The maximum RL of 0.1 mg/kg for 4-amino-2,6-DNT is well below the ecological soil screening value of 80 mg/kg adopted for this MC in the SLERA. Therefore, any uncertainties associated with the use of 2,4,6-TNT and 2-amino-4,6-DNT as surrogates for the explosive MCs are determined not to be significant for the SLERA.

5.2 Conceptual Site Model

5.2.0.1 The CSM diagram for the Madison Barracks FUDS is provided in Appendix J. The CSM defines the source(s) (e.g., the secondary source/media), interaction (e.g., secondary release mechanism, tertiary source, exposure route), and receptors at the FUDS and provides an overview of complete and potentially complete pathways. The CSM is limited to the area potentially impacted by MEC and/or MCs based on the site use and history. This area is shown in Figure 2-2. In this SI Report, the CSM has been revised from the version presented in the SS-WP Addendum to reflect the results of the human and ecological risk screening.

5.2.0.2 Current and future potential human receptors for the Madison Barracks FUDS are expected to be trespassers, recreational visitors (skiers and hikers), and employees, as depicted in the CSM diagrams in Appendix J. In the HHRA the soil screening values used for trespassers and recreational visitors were based on regional SLs for direct contact with residential soil. Recreational visitors, such as skiers and hikers, are unlikely to have as frequent and significant exposures to the surface soil as is assumed in development of the residential screening level that was used to make the risk decisions. Skiing would occur when snow is on the ground; therefore, no exposure to surface soil is expected. Hikers or other recreational park visitors exposure based on potential pathways (dermal and ingestion) is expected to be significantly less frequent than the 350 days per year assumed by USEPA in developing the residential screening level. Thus the

use of the residential screening levels for the hikers and other recreational park visitors at the Madison Barracks FUDS is likely to provide an overestimate of the potential risk. The screening values used for employees were based on the regional SLs for direct contact with industrial soil.

5.2.0.3 The ecological receptors of concern for the Madison Barracks FUDS are plants, soil and benthic invertebrates, terrestrial-feeding mammals, and terrestrial-feeding birds. Screening values selected for the SLERA were applied uniformly to all ecological receptors.

5.2.0.4 As described in the SS-WP Addendum for Madison Barracks no freshwater sources exist within the land areas of the FUDS. For this reason surface water and sediment were not considered to be media of concern. Per discussions during the TPP meeting, the groundwater wells located at the southern portion of the FUDS are not used for drinking water; therefore, groundwater is not considered a medium of potential concern and is not anticipated to present a potential pathway to receptors at the site

5.2.0.5 Potentially complete pathways for human and ecological receptors are based on the presence of MECs/MCs and interactions, including transport and release mechanisms, and receptor use patterns.

5.2.0.6 A pathway is complete if all of the following conditions are present:

1. Source and mechanism of chemical release (e.g., a munitions-related organic chemical is detected or a munitions-related inorganic chemical is detected and the levels exceed maximum and/or mean site background sample concentrations)[3].

2. Transfer mechanisms (e.g., overland flow of contaminants into an adjacent stream, advection of contaminants with groundwater flow).

3. Point of contact (exposure point, e.g., drinking water, soil).

4. Exposure route to receptor (e.g., ingestion, inhalation, etc.).

[3] In the case that an MC is never-detected and the MQO for sensitivity is not met (i.e., the RL is greater than the respective screening level for human or ecological receptors), the pathway remains potentially complete.

5.2.0.7 Comparisons of maximum detected site concentrations to risk-based screening values are used to determine if an MC is a COPC or COPEC, depending on the risk screening being conducted (human health or ecological, respectively). In the case that complete pathways exist between media and receptors, and a COPC and/or COPEC is identified, a WOE approach may be used to further evaluate the potential risk. The WOE approach considers multiple aspects of the MCs presence, including the frequency of detection, magnitude, and comparison to background, as well as the applicability of the screening criteria selected to the specific receptor groups and exposures that are likely to occur at the FUDS. A RI/FS may be recommended for MCs where COPCs and/or COPECs are determined to represent the potential for risks to an exposed receptor population. An NDAI designation may be recommended for MCs if no COPCs or COPECs are identified through the risk screening process, or if the weight-of-evidence evaluation indicates that COPCs/COPECs do not pose an unacceptable risk to the exposed receptors.

5.2.0.8 In conclusion, pathway completeness will result in a RI/FS recommendation for MCs only in the instance where risk screening criteria exceedances occur. A pathway can be complete but a RI/FS is not recommended if there are no exceedances of risk screening criteria, or if identified risks are determined to be at acceptable risk levels. When a pathway is incomplete, a RI/FS recommendation is not made.

5.3 Background Data Evaluation

5.3.0.1 During the SI field sampling, five background surface soil samples were collected from areas within or adjacent to the FUDS boundary and exhibit a similar geological or soil composition to the samples collected in MRS 1. The comparisons of concentrations of metals in background soils to on-site soils are shown in Table 5-4.

5.3.0.2 In surface soil within MRS 1, copper, lead, and nickel exhibited mean and maximum concentrations that were greater than the respective mean and maximum concentration in background surface soil.

5.4 Madison Barracks Target Range (MRS 1)

5.4.0.1 As presented in Section 5.1.1, the explosives DNT and DNT breakdown products and NG; and the metals copper, iron, lead, and nickel were identified as MCs to be analyzed at MRS 1. Surface soil, was identified as the single medium of concern for this area. Table 5-1 presents results of the screening level analysis in surface soils.

5.4.1 Soil Pathway and Screening Results

5.4.1.1 Surface soil was identified as a medium with potentially complete pathways for human and ecological receptors at MRS 1. A total of nine soil samples were collected from MRS 1; seven site surface soil samples and two duplicate surface soil samples. Table 5-1 presents the analytical results for surface and subsurface soils, along with the human health and ecological screening values described previously in Section 5.1.3.

5.4.1.2 Ingestion and dermal contact were identified as potential transfer mechanisms for MCs in surface soil to trespassers, recreational visitors, and employees at MRS 1. An identical set of potential transfer mechanisms was identified for ecological receptors at MRS 1. Five surface samples and one duplicate sample were collected within the vicinity of the impact areas and analyzed for the metal MCs specified in Section 5.4.0.1. An additional two surface soil samples, and a single duplicate sample, were collected from the training range firing point, and analyzed for the full suite of explosives and metal MCs specified in Section 5.4.0.1.

5.4.1.3 With the exception of NG, none of the explosive MCs were detected in surface soil at MRS 1. The RLs for all of the non-detected MCs were below the screening criteria adopted for the HHRA, and confirm the ability of the analytical techniques to detect these MCs at levels sufficient to screen for unacceptable risks to human receptors. NG was detected in a single surface soil sample (MBTR-MR1-SS-01-06) at MRS 1; however, NG was not detected in the duplicate soil sample that was collected at MBTR-MR1-SS-01-06. The detected sample concentration exceeded the screening criterion adopted for trespassers and recreational visitors; therefore, NG is a COPC for surface soil at MRS 1. The following factors were considered in the WOE evaluation to determine the risk significance of NG in surface soil at MRS 1:

- One of the three surface soil samples in which NG was analyzed had a detected concentration that exceeded the screening criterion selected for trespassers and recreational visitors (site sample: 5.7 mg/kg; screening criterion: 0.61 mg/kg).
- None of the three surface soil samples in which NG was analyzed had a detected concentration that exceeded the screening criterion selected for employees (screening criterion: 6.2 mg/kg).

5.4.1.4 As described in Section 5.1.3.6, the screening criteria for NG was derived by dividing the regional SL for residential and industrial soil by ten to account for potential simultaneous exposure to multiple non-carcinogenic compounds. The resulting screening criteria (0.61 and 6.2 mg/kg) are conservative in nature for screening risk at this MRS, where only five MCs are

detected. The detected concentration of NG does not exceed the unadjusted residential regional SL of 6.1 mg/kg. Based on the WOE exposure to NG in surface soil at MRS 1 is not anticipated to result in unacceptable risks to human receptors.

5.4.1.5 The metals copper, iron, lead, and nickel were detected in surface soil at MRS 1. The maximum concentration of iron and lead exceeded the screening criteria applied in the HHRA, and these metals are determined to be COPCs for MRS 1 surface soil. However, iron at MRS 1, was not elevated above background, and therefore, no additional site related risk to human receptors from exposure to this COPC is determined. The following factors were considered in a WOE evaluation to determine the risk significance of lead in surface soil at MRS 1:

- Two of the nine surface soil samples had detected concentrations that exceeded the screening criterion selected for trespassers and recreational visitors (site samples: 450 and 880 mg/kg; USEPA residential soil SL: 400 mg/kg).
- One of the nine surface soil samples had a detected concentration that exceeded the screening criterion selected for employees (USEPA industrial soil SL: 800 mg/kg).
- None of the five background surface soil samples had a detected concentration that exceeded the screening criterion selected for trespassers and recreational visitors.
- None of the five background surface soil samples had a detected concentration that exceeded the screening criterion selected for employees.
- Eight of the nine site surface soil samples had detected concentrations that exceeded the maximum background soil concentration.
- Eight of the nine site surface soil samples had detected concentrations that exceeded the mean background soil concentration.

5.4.1.6 Concentrations of lead in surface soil exceeded both the residential soil SL selected for screening risks to trespassers and recreational visitors, as well as that selected for employees (industrial soil SL). Site lead concentrations were significantly elevated above background detections. Based on these considerations exposure to lead in surface soil at MRS 1 is determined to present a potentially unacceptable risk to human receptors.

5.4.1.7 As described above in Section 5.4.1.3, NG was the single explosive MC detected in surface soil at MRS 1. The RLs for 2,4,-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene were below the ecological soil screening criteria selected for the SLERA, and confirm the ability of the analytical techniques to detect these MCs at levels sufficient to screen for unacceptable risks to ecological receptors.

5.4.1.8 No ecological soil screening value was available for NG, and therefore no definitive statement regarding potential risks associated with the measured concentration of the MC can be made. NG has a relatively low octanol-water partitioning coefficient (K_{ow}) of < 2 (U.S. NLM 2008). In general, K_{ow} in this range indicates that a chemical will be inefficient at partitioning into the lipid component of organisms and not bio-concentrate or bio-magnify up the food chain (USEPA 2005a). In addition, NG is readily biodegradable, a characteristic which also makes food chain exposures unlikely (USACHPPM 2007). Based on the fact NG was detected in only one of three samples and no other explosive MCs were detected, and considering fate and transport characteristics, NG was not identified as a COPEC in surface soil at MRS 1. The decision is not expected to introduce an unacceptable level of uncertainty into the SLERA. No explosive COPECs were identified in surface soil at MRS 1.

5.4.1.9 As described in Section 5.4.1.4, the metals, copper, iron, lead, and nickel were detected in surface soil at MRS 1. Maximum concentrations of copper, and lead were elevated above their respective ecological soil screening levels (maximum HQ: copper, 2.4; lead, 80). These two metals are COPECs for MRS 1 surface soil. No ecological soil screening level was available for iron, however as presented in Section 5.3.0.2 site iron was not elevated above background. Therefore no site related risk from iron is present. The following factors were considered as part of the WOE approach for determining the risk significance for the COPECs at MRS 1.

- Copper
  - Six of the nine site surface soil samples had detected concentrations that exceeded the ecological screening value (maximum HQ = 2.4).
  - None of the five surface soil background samples had a detected concentration that exceeded the ecological screening value.
  - Nine of the nine site surface soil samples had a detected concentration that exceeded the maximum background concentration.
  - Nine of the nine site surface soil samples had a detected concentration that exceeded the mean background concentration.

5.4.1.10 The site surface sample results for copper are significantly elevated above the background samples. Most of the site surface samples also exceeded the eco-SSL for copper, with a maximum HQ of 2. Furthermore, the elevated copper results are collocated with elevated lead results that exceed the lead eco-SSL. Copper may therefore present an unacceptable risk to ecological receptors.

- Lead

- Nine of the nine site surface soil samples had detected concentrations that exceeded the ecological screening value (maximum HQ = 80).
- Five of the five surface soil background samples had detected concentrations that exceeded the ecological screening value (maximum HQ = 3.6).
- Eight of the nine site surface soil samples had a detected concentration that exceeded the maximum background concentration.
- Eight of the nine site surface soil samples had a detected concentration that exceeded the mean background concentration.

5.4.1.11 Based on the frequency and magnitude with which site soil concentrations exceeded the screening criterion and background concentrations, exposure to lead in surface soil at MRS 1 is determined to present a potentially unacceptable risk to ecological receptors.

Table 5-1 Summary of Soil Analytical Results

			Screening Values for Trespasser and Visitors [a,b]	Screening Levels for Workers [a,b]	Screening Level for Biota							
Sample Name:						MBTR-MR1-SS-01-01	MBTR-MR1-SS-01-02	MBTR-MR1-SS-DUP#2	MBTR-MR1-SS-01-03	MBTR-MR1-SS-01-04	MBTR-MR1-SS-01-05	MBTR-MR1-SS-01-06	MBTR-MR1-SS-DUP#1
Sample Date:						4/27/2010	4/27/2010	4/27/2010	4/27/2010	4/27/2010	4/27/2010	4/27/2010	4/27/2010
Parent Name:								MBTR-MR1-SS-01-02					MBTR-MR1-SS-01-06
MRS:						MRS 1	MRS 1	MRS 1	MRS 1	MRS 1	MRS 1	MRS 1	MRS 1
Analyte	**CAS**	**Unit**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**								
Explosives													
2,4-DINITROTOLUENE	121-14-2	mg/kg	1.6	5.5	30 [d]	--	--	--	--	--	--	0.10 U	0.09 U
2,6-DINITROTOLUENE	606-20-2	mg/kg	6.1	62	30 [d]	--	--	--	--	--	--	0.10 U	0.09 U
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	15 [c]	200 [c]	80 [d]	--	--	--	--	--	--	0.10 U	0.09 U
2-NITROTOLUENE	88-72-2	mg/kg	2.9	13	30 [d]	--	--	--	--	--	--	0.20 U	0.19 U
3-NITROTOLUENE	99-08-1	mg/kg	0.61	6.2	30 [d]	--	--	--	--	--	--	0.20 U	0.19 U
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	15 [c]	190 [c]	80 [d]	--	--	--	--	--	--	0.10 U	0.09 U
4-NITROTOLUENE	99-99-0	mg/kg	30	110	30 [d]	--	--	--	--	--	--	0.20 U	0.19 U
NITROGLYCERINE	55-63-0	mg/kg	0.61	6.2	NSL	--	--	--	--	--	--	**5.70 J**	1.90 U
Metals													
COPPER	7440-50-8	mg/kg	310	4,100	28 [e]	*64.00*	*39.00*	*29.00*	*66.00*	*45.00*	*41.00*	14.00	14.00
IRON	7439-89-6	mg/kg	5,500	72,000	NSL	**19,000.00 J**	**20,000.00 J**	**20,000.00 J**	**19,000.00 J**	**19,000.00 J**	**16,000.00 J**	**17,000.00 J**	**18,000.00 J**
LEAD	7439-92-1	mg/kg	400	800	11 [f]	***880.00 J***	*250.00 J*	*250.00 J*	***450.00 J***	*240.00 J*	*360.00 J*	*58.00 J*	*57.00 J*
NICKEL	7440-02-0	mg/kg	150	2,000	38 [g]	13.00	14.00	14.00	17.00	14.00	14.00	12.00	12.00

			Screening Values for Trespasser and Visitors [a,b]	Screening Levels for Workers [a,b]	Screening Level for Biota						
Sample Name:						MBTR-MR1-SS-01-07	MBTR-BG-SS-01-01	MBTR-BG-SS-01-02	MBTR-BG-SS-01-03	MBTR-BG-SS-01-04	MBTR-BG-SS-01-05
Sample Date:						4/27/2010	4/27/2010	4/27/2010	4/27/2010	4/27/2010	4/27/2010
Parent Name:											
MRS:						MRS 1					
Analyte	**CAS**	**Unit**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**						
Explosives											
2,4-DINITROTOLUENE	121-14-2	mg/kg	1.6	5.5	30 [d]	0.09 U	--	--	--	--	--
2,6-DINITROTOLUENE	606-20-2	mg/kg	6.1	62	30 [d]	0.09 U	--	--	--	--	--
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	15 [c]	200 [c]	80 [d]	0.09 U	--	--	--	--	--
2-NITROTOLUENE	88-72-2	mg/kg	2.9	13	30 [d]	0.19 U	--	--	--	--	--
3-NITROTOLUENE	99-08-1	mg/kg	0.61	6.2	30 [d]	0.19 U	--	--	--	--	--
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	15 [c]	190 [c]	80 [d]	0.09 U	--	--	--	--	--
4-NITROTOLUENE	99-99-0	mg/kg	30	110	30 [d]	0.19 U	--	--	--	--	--
NITROGLYCERINE	55-63-0	mg/kg	0.61	6.2	NSL	1.90 U	--	--	--	--	--
Metals											
COPPER	7440-50-8	mg/kg	310	4,100	28 [e]	8.10	4.40	6.30	5.70	6.00	5.30
IRON	7439-89-6	mg/kg	5,500	72,000	NSL	**11,000.00 J**	**19,000.00 J**	**28,000.00 J**	**23,000.00 J**	**18,000.00 J**	**21,000.00 J**
LEAD	7439-92-1	mg/kg	400	800	11 [f]	*18.00 J*	*31.00 J*	*40.00 J*	*37.00 J*	*32.00 J*	*34.00 J*
NICKEL	7440-02-0	mg/kg	150	2,000	38 [g]	8.70	9.90	13.00	12.00	11.00	12.00

[a] Screening levels for human receptors at the site were derived from USEPA (2010) Regional Screening Levels for residential and industrial soils. Available from http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm.

[b] For non-carcinogens with the exception of lead, screening levels were divided by 10 to account for potential exposure to multiple non-carcinogens. No adjustment was made for carcinogens or lead..

[c] The USEPA screening levels for 2-amino-4,6-DNT and 4-amino-2,6-DNT is based on toxicity information for 2,4-DNT (from USEPA IRIS).

[d] Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, M. Cretella, P.H. Reno, and F.B. Daniel. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156.
Values for 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on the toxicity of 2,4,6-TNT.
The value for 4-amino-2,6-dinitrotoluene is based on the toxicity of 2-amino-4,6-dinitrotoluene.

[e] USEPA. 2007a. Ecological Soil Screening Level for Copper. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf.

[f] USEPA. 2005b. Ecological Soil Screening Level for Lead. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf.

[g] USEPA. 2007b. Ecological Soil Screening Level for Nickel. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf.

-- = No samples obtained
CAS = Chemical Abstract Service.
J = The associated value is an estimated quantity.
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
NSL = No screening level.
U = Not detected. Values listed are reporting limits (RLs).
USEPA = United States Environmental Protection Agency.

Shaded and bold values represent detected values that exceed human health screening criteria.
Shaded and italicized values represent detected values that exceed ecological screening criteria.
Shaded, bold, and italicized values represent detected values that exceed human health and ecological screening criteria.

Table 5-2
Non-Detection Concentrations and Screening Values for Human Receptors for Never-Detected Analytes

Analyte	CAS	Units	Minimum Non-Detect Concentration [a]	Maximum Non-Detect Concentration [a]	Screening Value - Trespasser, Visitor (Recreation) [b]	Screening Value - Employee [b]
Surface Soil						
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.09	0.1	1.6	5.5
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.09	0.1	6.1	62
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.09	0.1	15	200
2-NITROTOLUENE	88-72-2	mg/kg	0.2	0.2	2.9	13
3-NITROTOLUENE	99-08-1	mg/kg	0.2	0.2	0.61	6.2
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.09	0.1	15	190
4-NITROTOLUENE	99-99-0	mg/kg	0.2	0.2	30	110

[a] Detection limits are reporting limits (RLs).

[b] Screening levels for human receptors at the site were derived from USEPA (2010) Regional Screening Levels for residential (Trespasser/Visitor [Recreation]) and industrial (Employee) soils. Available from http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm.
Non-carcinogens screening levels were divided by 10 to account for potential exposure to multiple non-carcinogens. No adjustment was made for carcinogens.
The USEPA screening levels for 2-amino-4,6-DNT and 4-amino-2,6-DNT is based on toxicity information for 2,4-DNT,

CAS = Chemical Abstract Service.
mg/kg = Milligram per kilogram.
USEPA = United States Environmental Protection Agency.

Table 5-3
Non-Detection Concentrations and Screening Values for Ecological Receptors for Never-Detected Analytes

Analyte	CAS	Units	Minimum Non-Detect Concentration [a]	Maximum Non-Detect Concentration [a]	Screening Value - Biota [b]
Surface Soil					
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.09	0.1	30
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.09	0.1	30
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.09	0.1	80
2-NITROTOLUENE	88-72-2	mg/kg	0.2	0.2	30
3-NITROTOLUENE	99-08-1	mg/kg	0.2	0.2	30
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.09	0.1	80
4-NITROTOLUENE	99-99-0	mg/kg	0.2	0.2	30

[a] Detection limits are reporting limits (RLs).

[b] Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, M. Cretella, P.H. Reno, and F.B. Daniel. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156.
Values for 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on the toxicity of 2,4,6-TNT.
The value for 4-amino-2,6-dinitrotoluene is based on the toxicity of 2-amino-4,6-dinitrotoluene.

CAS = Chemical Abstract Service.
mg/kg = Milligram per kilogram.

Table 5-4
Comparison of Onsite and Background Soil Concentrations for Metals at MRS 1

	Onsite: MRS 1				Background				Comparisons	
Chemical	Detection Frequency	Minimum Concentration/ Qualifier (mg/kg) [a]	Maximum Concentration/ Qualifier (mg/kg) [b]	Mean Concentration (mg/kg)	Detection Frequency	Minimum Concentration/ Qualifier (mg/kg) [a]	Maximum Concentration/ Qualifier (mg/kg) [b]	Mean Concentration (mg/kg)	Site Maximum > Background Maximum	Site Mean > Background Mean
Surface Soil										
COPPER	9/9	8.10	66.0	35.6	5/5	4.40	6.30	5.54	YES	YES
IRON	9/9	11,000 J	20,000	17,700	5/5	18,000 J	28,000 J	21,800	NO	NO
LEAD	9/9	18.0 J	880 J	285	5/5	31.0 J	40.0 J	34.8	YES	YES
NICKEL	9/9	8.70	17.0	13.2	5/5	9.90	13.0	11.6	YES	YES

[a] Minimum concentration of analyte detected.
[b] Maximum concentration of analyte detected.

J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site

6. SUMMARY AND CONCLUSIONS

6.0.1 The Madison Barracks FUDS is located in Henderson, Jefferson County, New York. The FUDS property is approximately 866 acres in areal extent. The Army acquired portions of the land for Madison Barracks Target Range in May 1885 and November 1907. A portion of the property was used as a practice target range for small arms including .45 caliber pistol, .50 caliber machine gun, and .30 caliber Springfield and M-1 rifles. Additionally, .22 and .38 slugs were identified at the impact berm during the 2010 SI field activities. Former structures at this FUDS included a water tower, six "pill boxes", numerous concrete footings of old buildings, and numerous inhabited buildings (former offices, sheds, and residential) (Alion 2009b and USACE 2004b).

6.0.2 During the SI, a single MRS was identified at the Madison Barracks FUDS., as follows:

- MRS 1 - Madison Barracks Target Range

6.0.3 A summary of the results and conclusions is presented below, and is summarized in Table 6-1.

6.1.0 Madison Barracks Target Range (MRS 1)

6.1.0.1 Potential human receptors for MRS 1 include trespassers, recreational visitors, and employees. Potential ecological receptors are soil invertebrates, terrestrial-feeding mammals, and terrestrial-feeding birds.

6.1.0.2 Since military use of Madison Barracks ended in 1946, no observations of MEC have been reported by visitors, park personnel, or USACE at this MRS. No MEC was identified during the SI reconnaissance; however, numerous MD (expended bullet slugs) was observed. Although public access to the property is unrestricted during daylight hours, the overall MEC risk is low given the lack of an explosive risk (only expended bullets have been found on site), the condition of the impact berm (heavily vegetated), and the lack of documented or suspected use of any munitions other than small arms.

6.1.0.3 Surface soil was the single medium identified with potentially complete exposure pathways for human and ecological receptors in MRS 1. The surface soil pathway was determined to be complete for human receptors due to the detection of NG (no background data available) and the detection of several metals at concentrations that exceeded background.

Maximum detected concentrations of NG, iron, and lead exceeded the criteria adopted for screening risks to human receptors, and are determined to be COPCs for MRS 1 surface soil. Iron detections did not exceed background levels; therefore, no additional risk from FUDS related activity was identified for iron. Based on the WOE evaluation, exposure to NG does not present an unacceptable risk to humans; however, exposure to lead in soil may present a potentially unacceptable risk.

6.1.0.4 Due to the detection of NG (no background data available) and the detection of several metals at concentrations above background, the surface soil pathway was determined to be complete for ecological receptors at MRS 1. No eco-SSL was available for NG, however the WOE evaluation indicates that exposure to NG does not present an unacceptable risk to ecological receptors. However, maximum concentrations of copper and lead exceeded ecological screening criteria, and these MCs are therefore identified as COPECs for MRS 1 surface soil. Based on their respective WOE evaluations, both copper and lead in soil may present a potentially unacceptable risk to ecological receptors.

Table 6-1
Summary of Human Health and Ecological Screening Level Risk Assessment Results at Madison Barracks

	MRS 1 - Madison Barracks Training Range	
Medium	**Human Health COPCs (HHRA) [a]**	**Ecological COPECs (SLERA) [a]**
Surface Soil	NG, iron, and lead exceed screening criteria. COPCs. Iron detections were below background detections; therefore, no additional risk from FUDS related activities. **Based on WOE, NG is not expected to result in unacceptable risks to human receptors.** Potentially unacceptable risk from lead based on WOE.	Copper and lead exceed screening criteria. COPECs. Lead and copper exceed background. Potentially unacceptable risk from lead and copper based on WOE.

[a] Sources and derivations of screening levels for all receptors and environmental media in the HHRA and SLERA are detailed in Table 5-1.

COPC = Chemical of potential concern.
COPEC = Chemical of potential environmental concern.
HHRA = Human health risk assessment.
MRS = Munitions Response Site.
SLERA = Screening level ecological risk assessment.

7. RECOMMENDATIONS FOR FURTHER ACTION

7.0.1 One MRS was identified at the Madison Barracks Target Range FUDS. MRS 1 encompasses approximately 24 acres of land that continues off the FUDS property (866 acres) and ends at the berm.

7.0.2 Based on the results and conclusions of this SI, the following recommendations are provided:

> ***MRS 1 (Madison Barracks Target Range) –*** An RI/FS is recommended for MRS 1, with a focus only on MC. No MEC has been found since military use ended. During the SI field event, no MEC was found during the QR; however, numerous expended bullet slugs were observed near the impact berm. Additionally, subsurface anomalies were detected with the magnetometer during sample collection in that area. The potential risk posed by MEC at the small arms range portion of MRS 1, assessed through three risk factors (i.e., presence of MEC, accessibility or pathway presence, and potential receptor contact) was evaluated as low. NG, iron and lead were detected above the human health screening levels and were therefore identified as COPCs. NG is not expected to result in unacceptable risks to human receptors based on a WOE evaluation. The iron detection was below background and therefore no additional risks from FUDS related activities were identified for this MC. Lead, measured at concentrations elevated above background, was determined to present a potentially unacceptable risk to human receptors. Lead and copper were detected above the ecological SL and background concentrations. Lead and copper were identified as COPECs and determined to present a potentially unacceptable risk to ecological receptors.

7.0.3 Neither a TCRA nor a NTCRA are recommended for MRS 1 at the Madison Barracks Target Range FUDS.

7.0.4 USACE should revise the MRS acreage in their database to reflect the 24-acre small arms range instead of the 866 acres which represents the entire FUDS property. The 24 acres was derived from a 1958 aerial photograph and the location of the small arms range berm.

8. REFERENCES

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APPENDIX A – SCOPE OF WORK

Located on CD.

APPENDIX B – TECHNICAL PROJECT PLANNING MEMORANDUM

- Technical Project Planning (TPP) #1 Memorandum (Located on CD)
- TPP #2 Memorandum (Located on CD)
- Advertisement (Located on CD)
- Data Quality Objective Verification Worksheets

Data Quality Objective Verification Worksheet			
Site: **Madison Barracks Target Range**			
Project: FUDS MMRP SI Project Number **C02NY020400**			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Determine if the site requires additional investigation through a remedial investigation/feasibility study (RI/FS) or if the site may be recommended for No Department of Defense Action Indicated (NDAI) designation based on the presence or absence of munitions and explosives of concern (MEC) and munitions constituents (MC).	Yes__X__ No ____	
Data Needs Requirements:			
Data User Perspective(s)	Risk-MEC and MC, Compliance	Yes__X__ No ____	
Contaminant or Characteristic of Interest	MEC or Material Potentially Presenting an Explosive Hazard (MPPEH) and MC.	Yes__X__ No ____	
Media of Interest	MEC: Surface and subsurface MC: Surface soil	Yes__X__ No ____	
Required Sampling Locations or Areas	MEC and MC: Areas where military munition-related operations occurred and/or where MEC or MPPEH has been identified historically based on existing documentation and interviews.	Yes__X__ No ____	
Number of Samples Required	MEC: Analog geophysical and visual reconnaissance data will be collected to accomplish this objective. These data will be collected using "meandering path" to and from the sampling points. The UXO Technician will collect data on an approximate 6-ft wide path using the geophysical equipment. The visual reach of observations is approximately 12 ft, and may be limited by the presence of vegetation. Once at the individual sampling point, the geophysical equipment will be used to assess an approximately 25-ft diameter circle for anomalies around the sampling point as site conditions permit. In some areas, there may be limitations to the ability to complete geophysical and visual observations. The total estimated area on the paths to/from the sampling locations is approximately 50,086 ft², and the area around the sampling locations is approximately 3,430 ft² (Appendix A – Figure 8 of the SS-WP). MC: Seven surface soil samples will be collected at former firing points and impact areas within MRS 1 and/or the FUDS. Five background soil samples will be collected outside of the MRS of interest. Additional QA/QC samples will also be coll	Yes__X__ No ____	Sample locations vary slightly based on observations and the absence/presence of media and the presense of MD during field activities.

Data Quality Objective Verification Worksheet			
Site: **Madison Barracks Target Range**			
Project: FUDS MMRP SI Project Number **C03VA004502**			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Reference Concentration of Interest or Other Performance Criteria	MEC: If historic data indicate the presence of MEC and one anomaly classified as of MPPEH, or confirmed MEC is found with the magnetometer, or if physical evidence indicating the presence of MEC is found during the visual inspection, then an RI/FS may be recommended. If no anomalies, MPPEH, or confirmed MEC are found, or if the UXO Technician indicates that there is no potential hazard from past use of munitions or MEC discoveries, then an NDAI designation may be recommended. In each of these instances, all lines of evidence (e.g., historic data, field data, etc.) will be used to make a final decision for an NDAI designation or RI/FS. In both instances (RI/FS or NDAI designation), all lines of evidence (e.g., historic data, field data etc. for both MEC and MC) will be used to make a final decision for an NDAI designation or RI/FS.	Yes__X__ No ____	
	MC: If the maximum concentrations measured at the site exceed USEPA Regional Screening Levels (RSLs) based on current and future land use or USEPA interim ecological risk screening values, then an RI/FS may be recommended for the site. If the maximum concentrations measured at the site do not exceed RSLs or ecological risk screening values, then an NDAI designation may be recommended. In summary, all lines of evidence including secondary lines of evidence, such as historic data, field data and comparison to state screening/cleanup criteria, will be used to make a final decision for an NDAI designation or RI/FS. Screening values selected for comparison at this site are specified in the chemical-specific measurement quality objective (MQO) tables.	Yes__X__ No ____	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	MEC: Geophysics with a handheld analog magnetometer, which will used to collect related data, is accurate to an approximate depth of 2 ft. Global Positioning System (GPS) equipment will be used to log locations of MEC items encountered by the magnetometer. Visual observations will provide a continuous source of additional information which will be noted in the field log book with GPS coordinates. Photographs were used as an additional documentation method. Geophysical methods/procedures were described in detail in Section 3 of the SS-WP, and the Field Activities section of the programmatic field sampling plan (PFSP). MC: Sampling methods for MC were described in detail in Section 4 of the SS-WP, and Field Activities section of the PFSP.	Yes__X__ No ____	

Data Quality Objective Verification Worksheet			
Site: **Madison Barracks Target Range**			
Project: FUDS MMRP SI Project Number **C02NJ099301**			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Analytical Method	MEC: Analytical methods are not used with analog geophysics. However, trained UXO professionals, engineers, and scientists will review all data to determine whether evidence gathered indicates the presence or absence of MEC. This analysis will be subject to an independent review within the Alion Team, by the USACE North Atlantic New York (CENAN), USACE Baltimore District Design Center (CENAB), and USACE Center of Expertise MC: The methods that can be used for analysis include the following: Explosives Methods–8330A, Explosives Prep Methods - 8330A, Explosives Methods–8330A (mod), Explosives Prep Methods - 8330A (mod), Metals Methods–6010B, Metals Prep Methods – 3050B, Methods–6020, Metals Prep Methods – 3050B.	Yes__X__ No ____	

Data Quality Objective Verification Worksheet			
Site: **Madison Barracks Target Range**			
Project: FUDS MMRP SI Project Number **C02NY020400**			
DQO Statement Number: **2 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Determine the potential need for a Time-Critical Removal Action (TCRA) for MEC and MC by collecting data from previous investigations/reports, conducting site visits, performing analog geophysical activities, and by collecting MC samples.	Yes__X__ No ____	
Data Needs Requirements:			
Data User Perspective(s)	Risk-MEC and MC, Compliance	Yes__X__ No ____	
Contaminant or Characteristic of Interest	MEC or Material Potentially Presenting an Explosive Hazard (MPPEH) and MC	Yes__X__ No ____	
Media of Interest	MEC: Surface and subsurface MC: Surface soil	Yes__X__ No ____	
Required Sampling Locations or Areas	Areas where military munitions-related operations occurred and/or where MEC or MPPEH has been identified historically based on existing documentation and interviews [*See Figure 8 of the SS-WP*].	Yes__X__ No ____	
Number of Samples Required	Refer to DQO 1 for MC/MEC sampling parameters.	Yes__X__ No _____	
Reference Concentration of Interest or Other Performance Criteria	If MC is reported in samples collected at the FUDS at concentrations exceeding screening criteria and those exceedances result in unacceptable risk and an imminent threat to receptors as identified through human health and ecological risk assessments or if one piece of confirmed MEC is found with the magnetometer or if physical evidence indicating the presence of MEC is found during the visual inspection, and if the item(s) is determined by a qualified UXO-Technician, explosive ordnance disposal (EOD) unit, and/or the USACE to be an immediate or imminent threat, then one of two actions may be initiated:	Yes__X__ No ____	
	TCRA- If there is a complete pathway between source and receptor and the MEC and the situation is viewed as an "imminent danger threat posed by the release or threat of a release, where cleanup or stabilization actions must be initiated within six months to reduce risk to public health or the environment", the Alion Team will immediately notify the Military Munitions Design Center Project Manager at USACE and the property owner. USACE will determine, with input from the Alion Team and stakeholders, whether or not a TCRA will be implemented.	Yes__X__ No ____	
	Non-TCRA - A non-TCRA (NTCRA) may be initiated in response to a release or threat of release that poses a risk where more than six months planning time is available.	Yes__X__ No ____	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	MEC: Geophysical methods/procedures were described in detail in Section 3 of the SS-WP, and the Field Activities section of the programmatic field sampling plan (PFSP). MC: Sampling methods for MC were described in detail in Section 4 of the SS-WP, and Field Activities section of the PFSP.	Yes__X__ No ____	
Analytical Method	Refer to DQO 1 for MEC and MC analytical methods to be incorporated.	Yes__X__ No ____	

Data Quality Objective Verification Worksheet			
Site: **Madison Barracks Target Range**			
Project: FUDS MMRP SI Project Number **C02NY020400**			
DQO Statement Number: **3 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Collect, or develop, additional data, as appropriate, in support of potential Hazard Ranking System (HRS) scoring by United States Environmental Protection Agency (USEPA).	Yes__X__ No ____	
Data Needs Requirements:			
Data User Perspective(s)	Risk MC, Compliance	Yes__X__ No ____	
Contaminant or Characteristic of Interest	Data for HRS worksheet parameters will be compiled by gathering basic identifying information, general site description, site type, waste description, demographics, water use, sensitive environments, and response actions.	Yes__X__ No ____	
Media of Interest	MEC: Surface and subsurface MC: Surface soil	Yes__X__ No ____	
Required Sampling Locations or Areas	Areas where MEC has been historically found, used, or disposed as documented in interviews or existing documentation.	Yes__X__ No ____	
Number of Samples Required	Refer to DQOs 1and 2.		
Reference Concentration of Interest or Other Performance Criteria	The HRS levels of contamination are Level I (concentrations that meet the criteria for actual contamination and are at or above media-specific benchmark levels), Level II (concentrations that either meet the criteria for actual contamination but are less than media-specific benchmarks, or meet the criteria for actual contamination based on direct observation), and Potential (no observed release is required but targets must be within the target distance limit). These levels are weighted for each target by USEPA (Level I carries the greatest weight) and scores of 28.5 or above are then eligible for listing on the National Priorities List (NPL).	Yes__X__ No ____	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	Methods associated with historic data field reconnaissance and sampling (see DQOs 1 and 2). Refer to NPL Characteristics Data Collection Form, Version 3.0 (USEPA 2001).	Yes__X__ No ____	
Analytical Method	Refer to DQOs 1and 2 for associated methods.		

Data Quality Objective Verification Worksheet			
Site: **Madison Barracks Target Range**			
Project: FUDS MMRP SI Project Number **C02NY020400**			
DQO Statement Number: **4 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Collect the additional data necessary to the complete the Munitions Response Site Prioritization Protocol (MRSPP).	Yes__X__ No ____	
Data Needs Requirements:			
Data User Perspective(s)	Risk-MEC and MC, Compliance	Yes__X__ No ____	
Contaminant or Characteristic of Interest	Explosive Hazard Evaluation (EHE), Chemical Warfare Materiel Hazard Evaluation (CHE), and Health Hazard Evaluation (HHE). For the EHE and CHE modules, factors evaluated include the details of the hazard, accessibility to the Munitions Response Site (MRS), and receptor information. HHE factors include an evaluation of MC and any non-munitions-related incidental contaminants present, receptor information, and details pertaining to environmental migration pathways. Typical information compiled includes details pertaining to historical use, current/future use and ownership, cultural/ecological resources, and structures.	Yes__X__ No ____	
Media of Interest	MEC: Surface and subsurface MC: Surface soil	Yes__X__ No ____	
Required Sampling Locations or Areas	Areas where MEC has been identified historically and where sampling is recommended.	Yes__X__ No ____	
Number of Samples Required	Refer to DQOs 1 and 2 for related sampling required.		
Reference Concentration of Interest or Other Performance Criteria	An MRS priority is determined by USACE based on integrating the ratings from the EHE, CHE, and HHE modules. Refer to Federal Register/Vol. 70, No. 192/Wednesday, October 5, 2005/Rules and Regulations.	Yes__X__ No ____	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	Data gathering prior to field activities as well as additional data gathered during field reconnaissance and sampling (DoD 2005).	Yes__X__ No ____	
Analytical Method	Refer to DQOs 1and 2 for associated methods.		

APPENDIX C – INTERVIEW DOCUMENTATION

Appendix not used.

APPENDIX D – FIELD NOTES AND FORMS

- Daily Quality Control Reports
- Field Forms
- Logbook
- Chain of Custody

Alion Science and Technology, Inc.

DAILY QUALITY CONTROL REPORT

Report Number:	04-27-10-01	Date April 27, 2010	
Project Name:	Madison Barracks Target Range (C02NY020400)	Contract Number:	W912DY-04-D-0017
Location of Work:	Madison Barracks Target Range, Jefferson County, NY		
Description of Work: Collection of surface soil and background surface soil samples.			
Weather: Cloudy	Rainfall: Snow	Temperature: Min. 35 F	Max. 45 F

1. Work performed today by Alion:

The Alion field team collected seven surface soil samples. Two of the seven surface soil samples were collected from the approximate firing points and analyzed for select metals and explosives. The remaining five surface soil samples were collected from the berm (impact area) and analyzed for select metals. Qualitative reconnaissance was performed throughout MRS 1.

Samples Collected: Some sample locations may vary from SS-WP maps due to accessibility.

MBTR-MR1-SS-01-01	MBTR-MR1-SS-01-05	MBTR-BG-SS-01-02
MBTR-MR1-SS-01-02	MBTR-MR1-SS-01-06	MBTR-BG-SS-01-03
MBTR-MR1-SS-01-03	MBTR-MR1-SS-01-07	MBTR-BG-SS-01-04
MBTR-MR1-SS-01-04	MBTR-BG-SS-01-01	MBTR-BG-SS-01-05

Reconnaissance Acreage / Discussion:

Visual and magnetometer-assisted reconnaissance was conducted in the meandering path fashion with MRS 1 (Madison Barracks Target Range). During the Madison Barracks field activities on 04/27/10, geophysical reconnaissance using a Whites XLT was conducted at approximately 1.9 acres. Six regularly spaced berms were observed. These berms were approximately 1 foot high and spaced approximately 100 yards apart, perpendicular to the line of fire and parallel to the main berm. The main berm at the end of the rifle range was a concrete structure, approximately 6-8 feet tall.

2. Work performed today by Subcontractors.

None

3. Type and results of Control Phases and Inspection. (Indicate whether Preparatory – P, Initial – I, or Follow-Up – F and include satisfactory work completed or deficiencies with actions to be taken)

Preparatory phase inspections for the field were completed prior to mobilization to Madison Barracks Target Range FUDS. Initial phase of inspections were completed upon arrival at the site. No follow-up inspections were completed. Satisfactory work completed.

4. List type and location of tests performed and results of these tests.

The Whites XLT metal detector checked ok.

GPS benchmark control point coordinates were collected prior to field work and then again after completion of the fieldwork (see below). Trimble- Benchmark coordinates collected in the parking lot of Robert Wehle State Park.

Benchmark coordinates: Northing 4858742.551 meters (m), Easting 398262.700 m, (UTM, Zone 18N, CONUS 1983).

Initial GPS reading: Northing 4858742.662 meters (m), Easting 398262.737 m, (UTM, Zone 18N, CONUS

1983).
Post event GPS reading: Northing 4858742.542 meters (m), Easting 398262.526 m, (UTM, Zone 18N, CONUS 1983).
5. Submittals reviewed. (Include Transmittal No., Item No., Spec/Plan Reference, by whom, and any action.
None
6. Off-site surveillance activities, including action taken.
None
7. Job Safety. (Report safety violations observed and actions taken)
No health and safety violations occurred during the sampling event. All work was performed in a safe and efficient manner.
8. Remarks. (Instructions received or given. Conflicts in Plans or Specifications)
Performed geophysical reconnaissance in and around the Madison Barracks FUDS including the length of the target range and the impact berm. Six subsurface anomalies were recorded (GPS) while performing qualitative reconnaissance (QR) within the FUDS. Five surface anomalies were recorded at the location of the impact berm and identified as Munitions Debris (MD). These items consisted of .22. .30, .38 and .45 caliber bullets and shell casings. All soil sample locations were clear of metallic debris as certified by the UXO technician. No munitions presenting a potential explosive hazard (MPPEH) [inclusive of or munitions debris (MD), munitions, explosives of concern (MEC), range related debris] were identified at the FUDS.

Alion Science and Technology, Inc's Verification: On behalf of Alion, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

Curtis W Mitchell

HEALTH AND SAFETY PLAN REVIEW RECORD

SITE: MADISON BARRACKS TARGET RANGE

ALION Project No. C02NY020400

I have read the Health and Safety Plan (s) and have been briefed on the nature, level, and degree of exposure likely as a result of participation of field activities. I agree to conform to all the requirements of this Plan.

Name	Signature	Affiliation	Date
Kimberly Eyers		Alion	4/27/10
Jotie Healey		HFA	4-27-10
Todd Blanco		Alion	4-27-10

SITE ENTRY AND EXIT LOG

Project/Site : MADISON BARRACKS TARGET RANGE

Project No.: C02NY020400

Date	Name	Representing	Time In	Time Out
4/27/10	Kimberly Eves	Alion	9:30	1700
4/27/10	JOHN HEALEY	HFA	9:00	1700
4/27/10	TODD BELLINGER	ALION	9:00	1700

DAILY SITE SAFETY JOURNAL
Page 1 of 2

DATE: 4/27/10	PROJECT: MADISON BARRACK TARGET RANGE
Field UXO Technician: JOHN HEALEY	

AREA / ITEMS INSPECTED	SAT	UNSAT
Proper work attire (PPE)	✓	
Vehicle condition	✓	
Emergency equipment	✓	
Safe demolition procedures	N/A	
Field office, inside	✓	
Field office grounds	✓	

[ ] Last Work Days Events
[ ] Site Description
[ ] Work Area Description
[ ] Work Area Hazards
[ ] On-Site Emergency
[ ] Site Evacuation Procedures
[ ] Emergency Response Personnel
[ ] Emergency Telephone Numbers
[ ] Directions to Hospital
[ ] First Aid
[ ] Heat / Cold Stress
[ ] Asbestos Awareness & ID
[ ] Ticks
[ ] Safety Concerns
[ ] Personnel Protective Equipment
[ ] Safe Work Practices
[ ] Emergency Response Plan
[ ] Chemical Hazards
[ ] Emergency Equipment, Location
[ ] Emergency Equipment, by Type
[ ] Emergency Decontamination
[ ] Safe Work Practices - General
[ ] Site specific OE Safety Precautions
[ ] Site specific OE Identification Features
[ ] Liquid Contaminates / Landfill Material
[ ] Other _____

Comments:

UXO Technician in Field SIGNATURE:

DAILY SITE SAFETY JOURNAL
MEETING ATTENDEES
DATE: 4/27/10
Page 2 of 2

	Name	Affiliation
1	Kimberly EVERS	Alion
2	John HEALEY	HTA
3	TODD BELANGER	Alion
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Chain of Custody Record

Sampler ID _____

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☐

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124-280 (0508)

Client	Project Manager	Date	Chain of Custody Number
HUDN SCIENCE + TECHNOLOGY	SARAH MOORE	4/27/10	123953
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 2**
3975 FAIR RIDGE DR. SUITE 125S.	703-259-5155		

City	State	Zip Code	Site Contact	Lab Contact
FAIRFAX	VA	22033	KIM EVERS	ELAINE WALKER

Project Name and Location (State)	Carrier/Waybill Number
MADISON BARRACKS TARGET RANGE	

Contract/Purchase Order/Quote No.
MMRP FUDS

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	Analysis: METALS-Cu, Pb, Ni 6020	METALS-Fe 6010B	EXPLOSIVES 8330A	NITROGLYCERIN 8330A	Special Instructions/ Conditions of Receipt
MBTR-MRI-SS-01-01	4/27/10	1300				X	1						X	X			
MBTR-MRI-SS-01-02	4/27/10	1235				X	1						X	X			
MBTR-MRI-SS-01-03	4/27/10	1220				X	1						X	X			
MBTR-MRI-SS-01-04	4/27/10	1150				X	1						X	X			
MBTR-MRI-SS-01-05	4/27/10	1130				X	1						X	X			
MBTR-MRI-SS-01-06	4/27/10	1045				X	6						X	X	X	X	MS/MSD
MBTR-MRI-SS-01-07	4/27/10	1030				X	2						X	X	X	X	
MBTR-MRI-SS-DUP#1	4/27/10	1050				X	2						X	X	X	X	
MBTR-MRI-SS-DUP#2	4/27/10	1240				X	1						X	X			
MBTR-BG-SS-01-01	4/27/10	1600				X	1						X	X			
MBTR-BG-SS-01-02	4/27/10	1625				X	1						X	X			
MBTR-BG-SS-01-03	4/27/10	1630				X	1						X	X			

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal

☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

1. Relinquished By	Date	Time	1. Received By	Date	Time
Kimberly Evers	4/27/10	21:00			
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments * Reduced List ** explosives: DNT + DNT Breakdown (2,4-DNT; 2,6-DNT; 2-Amino-4,6-DNT; 2-Nitrotoluene; 3-Nitrotoluene; 4-Amino-2,6-DNT; 4-Nitrotoluene.

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Chain of Custody Record

Sampler ID _____

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☐

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124-280 (0508)

Client	Project Manager	Date	Chain of Custody Number
ALION SCIENCE + TECHNOLOGY	SARAH MOORE		123954
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 2 of 2**
3975 FAIR RIDGE DR. SUITE 125S.	703-259-5155		
City / **State** / **Zip Code**	**Site Contact**	**Lab Contact**	**Analysis (Attach list if more space is needed)**
FAIRFAX / VA / 22033		ELAINE WALKER	
Project Name and Location (State)	**Carrier/Waybill Number**		
MADISON BARRACKS TARGET RANGE			
Contract/Purchase Order/Quote No.			
MMRP FUDS			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/ NaOH	Analysis: METALS-Cu, Pb, Ni (6020)	METALS-Fe (6010B)	Special Instructions/ Conditions of Receipt
MBTR-BE-SS-01-04	4/27/10	1610				X	1						X	X	
MBTR-BE-SS-01-05	4/27/10	1615				X	1						X	X	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other_____

QC Requirements (Specify)

1. Relinquished By	Date	Time	1. Received By	Date	Time
[signature]	4/27/10	21:00			
2. Relinquished By	Date	Time	2. Received By	Date	Time
3. Relinquished By	Date	Time	3. Received By	Date	Time

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

LEGEND, Inc.

ONE JOB FIELD BOOK

Project Name: MADISON BARRACKS TARGET RANGE

Project Number: C02NY02,0400

Date: April 27, 2010

Contract No W912DY-04-0017

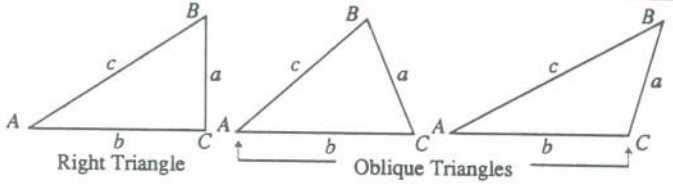
Delivery Order#: 0017000 1

16 Pages

50% cotton content

water-resistant paper

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B$, $c = \sqrt{a^2 + b^2} = a\sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B$, $b = \sqrt{(c + a)(c - a)} = c\sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90° - A$, $b = a \cot A$, $c = \frac{a}{\sin A}$.
A, b	B, a, c	$B = 90° - A$, $a = b \tan A$, $c = \frac{b}{\cos A}$.
A, c	B, a, b	$B = 90° - A$, $a = c \sin A$, $b = c \cos A$,

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A}$, $C = 180°-(A + B)$, $c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a}$, $C = 180° - (A + B)$, $c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180° - C$, $\tan \frac{1}{2}(A - B) = \frac{(a-b) \tan \frac{1}{2}(A+B)}{a+b}$, $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2}$, $\sin \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{b\,c}}$, $\sin \frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{a\,c}}$, $C = 180° - (A + B)$
a, b, c	Area	$s = \frac{a+b+c}{2}$, area $= \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	area $= \frac{b\,c \sin A}{2}$
A, B, C, a	Area	area $= \frac{a^2 \sin B \sin C}{2 \sin A}$

Signature Page

1

Print	Sign	Initials
Kimberly Evers		KVE
TODD BELANGER		TB
JOHN HEALEY		

(2)

Table of Contents

JM KVE

(3)

Contact Information

Alion Science and Technology Corporation
- K. Evers 703-201-9739
- T. Belanger 360-220-8198
- R. Gzar 301-399-7304
- J. Healey 267-312-9150

Test America Laboratory
4955 Yarrow St. Arvada, CO 80002
- Elaine Walker - 303-7360156 off
303-471-7171 fax

USACE -
- Alan Warminski 410-962-7677

USACE Baltimore District
- Julie Kaiser 410-962-2227
443-986-3449 cell

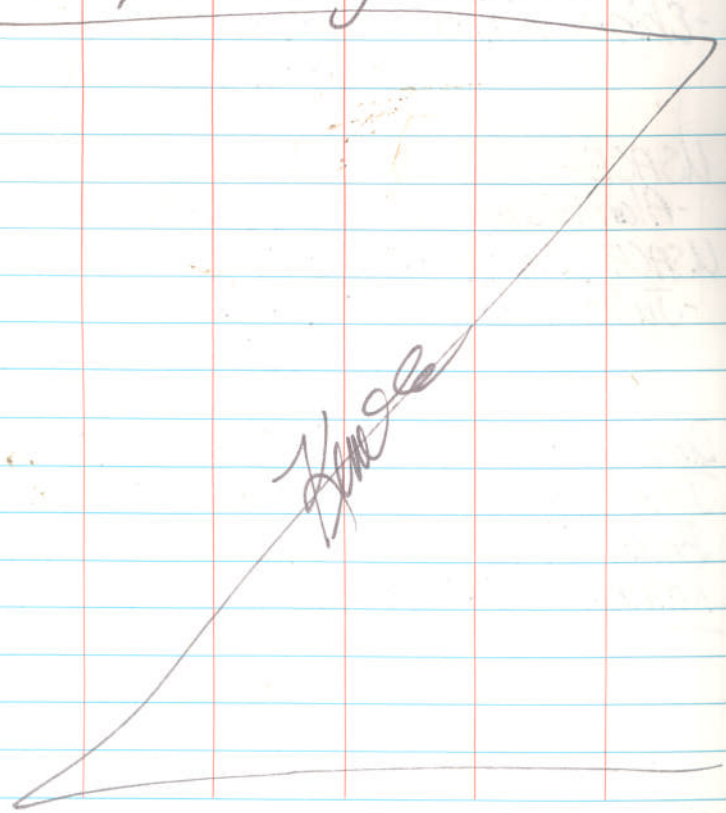
Dan Eaton (NYDEC) - 518-402-9620
John Shultz (OPRHP 315-938-5300)
Brian Thomas (") 315-482-2593
Katrina: 410-919-1965

JM KVE

Benchmark

Morning Benchmark:
4/27/2010 Northing - 4858742.662
9:06am Easting - 398262.737

Evening Benchmark
4/87/2010 Northing - 4858742.542
3:33pm Easting - 398262.526



Tues. April 27th, 2010

930: Arrive at Robert Wehle State Park K.Eevers, T.Belanger + J. Healey. Weather: Cloudy, Snowing 35°. Windy Calibrate Whites + Install new batteries.

10:00 John Healey gives Health + Safety Briefing. Benchmark recorded in parking lot of Robert Wehle State Park parking lot.

10:15 Begin walking down rifle range in meandering path while recording GR.

10:30 Collect Sample [MBTR-MR1-SS-01-07] Sample collected from an elevated mount of dirt extending across the width of the rifle range.

1045 Collected sample [MBTR-MR1-SS-01-06] and MS/MSD for metals + exp.

1050 Collect Dup sample [MBTR-MR1-SS-Dup#1]

1105 Located impact berm at the end of the rifle range.

1110 Located a pill box along the shore of Lake Ontario.

1115 Walked the length of the impact berm.

(6) 4/27/2010 KLE

1130 Collected sample MBTR-MR1-SS-01-05 for metals. in the impact berm on the east end.
1145 Moved to location for next sample
1150 Collected sample MBTR-MR1-SS-01-04 Sample biased to location of 2 bullets found in berm. John inspected the bullet and determined them to be 30 cal bullets. Also .22, .30, .38 + .45 cal bullets in berm. The 38+ 45 cal were most likely from pistols.
1220 Moved further down the berm and collected sample MBTR-MR1-SS-01-03 Found multiple bullets + casings in location of sample. Bullets were .30 cal.
1235 Collected sample MBTR-MR1-SS-01-02
1240 Collected dublicat sample MBTR-MR1-SS-DUP#2
*1300
1330 Arrive back at car.
1400 Drive to background location parking lot.
1430 Begin hiking to BG + pill

JW KLE

4/27/2010 KLE (7)

boxes along the shoreline.
1500 Located 3 pill boxes along Lake Ontario + 2 pill boxes in the woods. Pill boxes along lake are partially destroyed
1600 Collect background MBTR-BG-SS-01-01
1610 Collect background MBTR-BG-SS-01-04
1615 Collect background MBTR-BG-SS-01-05
1625 Collect background MBTR-BG-SS-01-02
1630 Collect Background MBTR-BG-SS-01-03
1650 Collect PLN benchmark
1700 Depart Site for the day
*1300 Collect Sample MBTR-MR1-SS-01-01

JW KLE

Sample ID	Date/Time	Northing	Easting
MBTR-MRI-SS-01-07	4/27/10 9:19 AM	4858939.494	398396.651
MBTR-MRI-SS-01-06	" 9:44 AM	4859179.579	398530.216
MBTR-MRI-SS-01-05	" 10:27 AM	4859375.970	398727.436
MBTR-MRI-SS-01-04	" 10:47 AM	4859379.698	398714.696
MBTR-MRI-SS-01-03	" 11:17 AM	4859396.879	398687.289
MBTR-MRI-SS-01-02	" 11:32 AM	4859407.804	398670.030
MBTR-MRI-SS-01-01	" 11:54 AM	4859415.081	398665.351
MBTR-BG-SS-01-01	" 3:05 pm	4856887.285	~~396734.570~~ ~~396734.587~~
MBTR-BG-SS-01-02	" 3:28 pm	4856308.336	397001.200
MBTR-BG-SS-01-03	" 3:35 pm	4856121.708	397082.949
MBTR-BG-SS-01-04	" 3:15 pm	4856679.451	396753.663
MBTR-BG-SS-01-05	" 3:19 pm	4856672.940	396802.532

4/27/10

Anomaly.

Anomaly type	Northing	Easting
subsurface	4859318.039	398653.797
"	4859396.481	398687.538
"	4859377.466	398717.224
"	4859374.104	398724.183
"	4859404.600	398683.949
"	4859411.085	398671.450
"	4859413.317	398668.342

D-14

CONTENTS VALUABLE

Please Return To:

Name: Roger Azar / Sarah Moore

Company: Alion Science and Technology Inc.

Street: 3975 Fair Ridge Drive

City: Fairfax State: VA.

Phone: 703 259.5155

APPENDIX E – PHOTO DOCUMENTATION LOG

APPENDIX E – PHOTOGRAPHIC LOG

Project/Site: Madison Barracks Target Range

Project No.: C02NY020400

Date	Photo ID	Description
4/27/2010	E.1	View of Lake Ontario from the FUDS boundary.
4/27/2010	E.2	Current condition of a pill box within the FUDS boundary on the banks of Lake Ontario.
4/27/2010	E.3	Current condition of a pill box within the FUDS boundary.
4/27/2010	E.4	Northernmost pill box on Lake Ontario.
4/27/2010	E.5	Current conditions of the firing point and the location of MBTR-MR1-SS-01-07.
4/27/2010	E.6	Current conditions of the firing point.
4/27/2010	E.7	Current conditions of the back side of the berm impact area.
4/27/2010	E.8	Current conditions of the side of the berm impact area.
4/27/2010	E.9	Current conditions of the back side of the berm impact area
4/27/2010	E.10	MD observed during field activities at Rifle Range berm.
4/27/2010	E.11	MD observed during field activities at Rifle Range berm.
4/27/2010	E.12	Collecting MBTR-MR1-SS-01-04 surface soil sample.

Madison Barracks Target Range – Field Photographs

Site:	Madison Barracks Target Range
Photographer:	Kim Evers
Location of Photograph:	Location of FUDS on Lake Ontario
GPS Coordinates: (UTM Zone 18N)	N 4857647.67 E 396394.34
Direction of Photo:	South
Comments:	View of Lake Ontario from the FUDS boundary.
Photograph No.:	E.1 Date: 4/27/2010 Time: 2:30 PM

Site:	Madison Barracks Target Range
Photographer:	Kim Evers
Location of Photograph:	Pill box within the FUDS boundary
GPS Coordinates: (UTM Zone 18N)	N 4857583.01 E 396382.58
Direction of Photo:	East
Comments:	Current condition of a pill box within the FUDS boundary on the banks of Lake Ontario.
Photograph No.:	E.2 Date: 4/27/2010 Time: 2:30 PM

Madison Barracks Target Range – Field Photographs

Site:	Madison Barracks Target Range
Photographer:	Kim Evers
Location of Photograph:	Pill box within the FUDS boundary
GPS Coordinates: (UTM Zone 18N)	N 4857400.78 E 396212.11
Direction of Photo:	East
Comments:	Current condition of a pill box within the FUDS boundary.
Photograph No.:	E.3 Date: 4/27/2010 Time: 2:40 PM

Site:	Madison Barracks Target Range
Photographer:	Kim Evers
Location of Photograph:	Pill box within the FUDS boundary
GPS Coordinates: (UTM Zone 18N)	N 4859458.19 E 398616.34
Direction of Photo:	West
Comments:	Northernmost pill box on Lake Ontario.
Photograph No.:	E.4 Date: 4/27/2010 Time: 10:17 AM

Madison Barracks Target Range – Field Photographs

Site: Madison Barracks Target Range
Photographer: Kim Evers
Location of Photograph: MRS 1- firing point
GPS Coordinates: N 4859178.58 E 398530.22
(UTM Zone 18N)
Direction of Photo: East
Comments: Current conditions of the firing point and the location of MBTR-MR1-SS-01-07
Photograph No.: E.5 Date: 4/27/2010 Time: 10:07 AM

Site: Madison Barracks Target Range
Photographer: Kim Evers
Location of Photograph: MRS 1- firing point
GPS Coordinates: N 4858939.49 E 398396.65
(UTM Zone 18N)
Direction of Photo: East
Comments: Current conditions of the firing point
Photograph No.: E.6 Date: 4/27/2010 Time: 9:34 AM

Madison Barracks Target Range – Field Photographs

Site: Madison Barracks Target Range
Photographer: Kim Evers
Location of Photograph: MRS 1- berm impact area
GPS Coordinates: N 4859398.80 E 398699.33
(UTM Zone 18N)
Direction of Photo: East
Comments: Current conditions of the back side of the berm impact area
Photograph No.: E.7 Date: 4/27/2010 Time: 10:21 AM

Site: Madison Barracks Target Range
Photographer: Kim Evers
Location of Photograph: MRS 1- berm impact area
GPS Coordinates: N 4859418.72 E 398657.14
(UTM Zone 18N)
Direction of Photo: East
Comments: Current conditions of the side of the berm impact area
Photograph No.: E.8 Date: 4/27/2010 Time: 10:15 AM

Madison Barracks Target Range – Field Photographs

Site: Madison Barracks Target Range
Photographer: Kim Evers
Location of Photograph: MRS 1- berm impact area
GPS Coordinates: N 4859415.21 E 398677.07
(UTM Zone 18N)
Direction of Photo: South
Comments: Current conditions of the back side of the berm impact area.
Photograph No.: E.9 Date: 4/27/2010 Time: 10:20 AM

Site: Madison Barracks Target Range
Photographer: Kim Evers
Location of Photograph: MRS 1- berm impact area
GPS Coordinates: N 4859375.97 E 398727.44
(UTM Zone 18N)
Direction of Photo: Toward the ground
Comments: MD observed during field activities at Rifle Range berm.
Photograph No.: E.10 Date: 4/27/2010 Time: 11:43 AM

Madison Barracks Target Range – Field Photographs

Site: Madison Barracks Target Range	Site: Madison Barracks Target Range
Photographer: Kim Evers	Photographer: Kim Evers
Location of Photograph: MRS 1 – berm impact area	Location of Photograph: MRS 1- berm impact area
GPS Coordinates: N 4859394.11 E 398709.88 (UTM Zone 18N)	GPS Coordinates: N 4859394.11 E 398709.88 (UTM Zone 18N)
Direction of Photo: Toward the ground	Direction of Photo: Toward the ground
Comments: MD observed during field activities at Rifle Range berm.	Comments: Collecting MBTR-MR1-SS-01-04 surface soil sample.
Photograph No.: E.11 Date: 4/27/2010 Time: 11:43 PM	Photograph No.: E.12 Date: 4/27/2010 Time: 10:38 AM
	

APPENDIX F – ANALYTICAL DATA

- Automated Data Review Library
- Automated Data Review EDDs
- EDMS
- Analytical Summary Reports
- Analytical Data Reports
- SEDD Deliverable

Located on CD.

APPENDIX G – ANALYTICAL DATA QUALITY ASSURANCE/ QUALITY CONTROL REPORT

- Validated Data from EDS
- USACE Memorandum for Record-CQAR of Quality Assurance Split Samples. (Split Samples not collected in accordance to CENAB direction.)
- Chemical Data Quality Assessment Report (CDQAR)

Located on CD.

APPENDIX H – GEOGRAPHIC INFORMATION SYSTEMS DATA

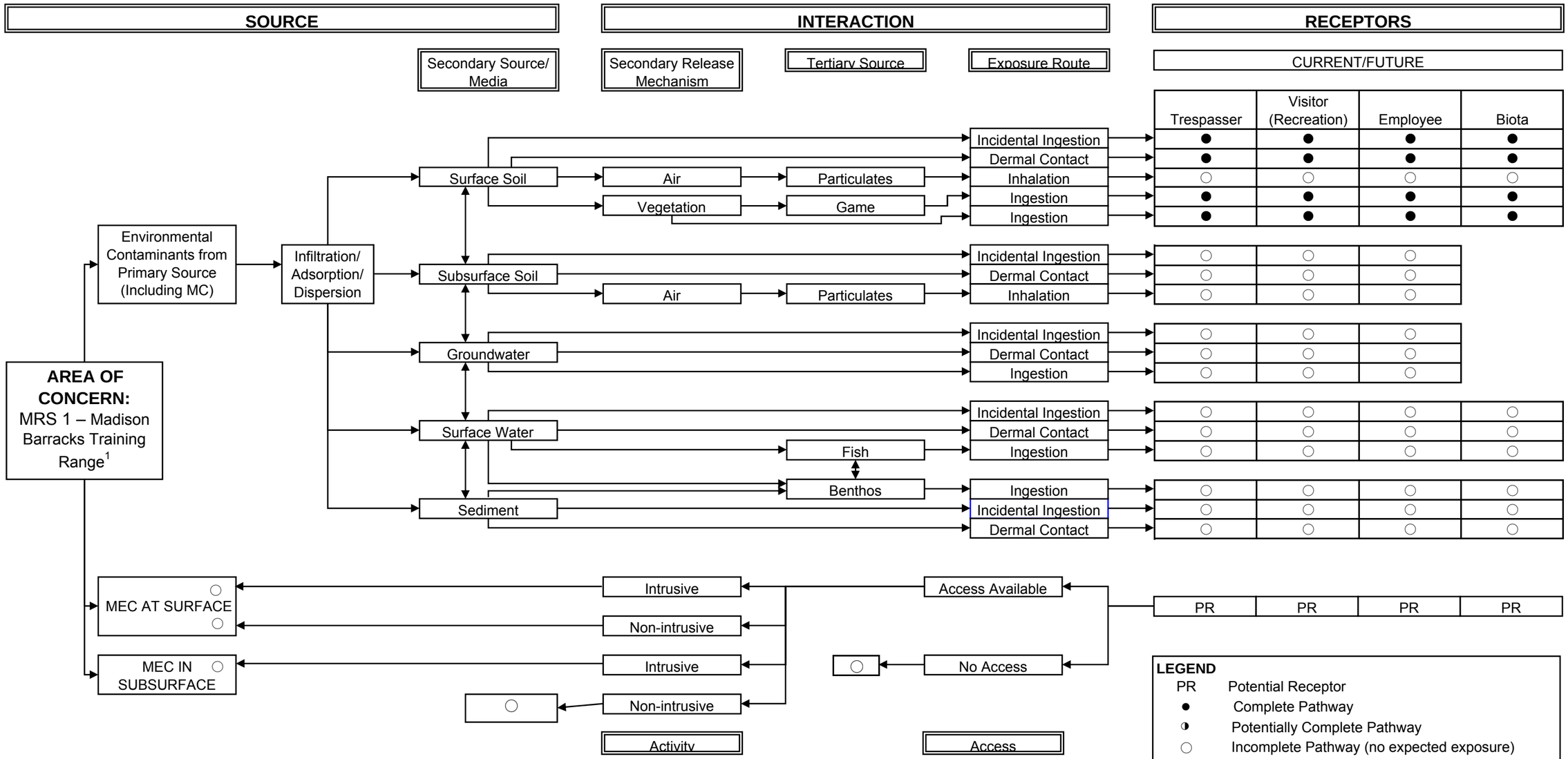
Located on CD.

APPENDIX I – GEOPHYSICAL DATA

Appendix not used.

APPENDIX J – CONCEPTUAL SITE MODEL

MRS 1 – Madison Barracks Target Range



NOTES:

1. For the MMRP SI at Madison Barracks Target Range, this CSM summarizes the potential risk exposure scenarios for MRS 1 –Madison Barracks Training Range. For a pathway to be complete, it must include a source, an exposure medium, an exposure route, and a receptor. A complete pathway may also include a release mechanism and a transport medium. Interaction between a potential receptor and MEC has two components: access and activity.

2. Primary sources location for MRS 1 is where historical training activities occurred. The presence of MEC is unlikely given the only observed MD was expended bullets; therefore, the pathway is incomplete for all receptors in surface and subsurface soil.

3. Typically MC associated with smalls arms are present in the surface soil; therefore, subsurface soil and groundwater were not a medium of concern. In addition, groundwater is not used within the MRS and existing wells are located several miles south of this MRS. There are no freshwater sources within the MRS, therefore, surface water and sediment are not media of concern. Lead and copper were detected above background, and NG was detected; therefore, the pathway is complete for surface soil.

DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR MMRP FUDS

MADISION BARRACKS TARGET RANGE[1,2,3]

MRS 1 - Madison Barracks Training Range

Revised August 2010 J-1

Source: U.S. Army Corps of Engineers (USACE). 2003. *Conceptual Site Models for Ordnance and Explosives (OE) and Hazardous, Toxic, and Radioactive Wastes (HTRW) Projects.* EM 1110-1-1200.

APPENDIX K – MUNITIONS REPONSE SITE PRIORITZATION PROTOCOL RESULTS

- MRS 1 – Madison Barracks Target Range

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: MRS 1 -Madison Barracks Target Range

Component: U.S. Army

Installation/Property Name: MRS 1 -Madison Barracks Target Range (FFID NY29799F109000)

Location (City, County, State): Henderson, Jefferson County, New York

Site Name/Project Name (Project No.): Madison Barracks Target Range (C02NY020400)/ (RMIS ID C02NY020400R01)

Date Information Entered/Updated: 9/10/2010 10:36:07 AM

Point of Contact (Name/Phone): Gregory Goepfert 917-790-8235

Project Phase (check only one):

☐ PA	■ SI	☐ RI	☐ FS	☐ RD
☐ RA-C	☐ RIP	☐ RA-O	☐ RC	☐ LTM

Media Evaluated (check all that apply):

☐ Groundwater	☐ Sediment (human receptor)
■ Surface soil	☐ Surface Water (ecological receptor)
☐ Sediment (ecological receptor)	☐ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:

The Madison Barracks Target Range FUDS was comprised of approximately 866 acres, all of which became part of Wehle State Park. The Army acquired portions of the land for Madison Barracks Target Range in May 1885 and November 1907. Between 1885 and 1947, the site was used as a troop staging and training area. A portion of the property was used as a practice target range for small arms including .45 caliber pistol, .50 caliber machine gun, and .30 caliber Springfield and M-1 rifles (also .22 caliber and .38 caliber were used based on field observations). No munitions and explosives of concern (MEC) have been found since the end of military use (1946); however, expended munitions debris (MD) were observed during the 2010 SI field activities. No UXO or DMM are expected to be present at the Madison Barracks Target Range FUDS. The property is currently owned by the state of New York and managed as Wehle State Park. The park is used for recreational purposes (USACE 1991). Refer to Paragraphs 2.1.1, 2.1.2, 2.1.3, 2.1.4, 2.1.5, 2.4.2.2, 2.4.3.1, 2.4.3.2, 2.5.1, 4.2.1.1, 4.3.1.1, 4.3.1.2, and Table 2-2 of the SI Report.

Description of Pathways for Human and Ecological Receptors:

Lead and copper were detected above background, and NG was detected; therefore, the pathway is complete for surface soil (the only media of concern identified). NG and lead were identified as Chemicals of Potential Concern (COPC) for human receptors. Lead and copper were identified as Chemicals of Potential Ecological Concern (COPEC) for ecological receptors. No MEC items have been reported historically and none were observed during the 2010 SI field activities. However, expended bullets and bullet casings (MD) were observed during the 2010 field activities. Refer to the CSM for MRS 1 (Appendix J) and Paragraph 5.2.0.2 of the SI Report.
Description of Receptors (Human and Ecological):
Human receptors are trespassers, park visitors and employees (park personnel). Ecological receptors of concern are plants and benthic invertebrates. Refer to the CSM for MRS 1 (Appendix J) and Paragraph 5.2.0.2 of the SI Report.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms practice munitions, small arms ammunition, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ UXO that are considered likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). ◆ Hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazardard.	30
High explosive (used or damaged)	◆ UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ UXO containing a pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). ◆ DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ DMM containing a high explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrothechnics, or propellant	◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ UXO that are practice munitions that are not associated with a sensitive fuze. ◆ DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ Used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	(0)

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

Madison Barracks Target Range FUDS was used by the Army acquired portions of the land for Madison Barracks Target Range in May 1885 and November 1907. Between 1885 and 1947, the site was used as a troop staging and training area. A portion of the property was used as a practice target range for small arms including .45 caliber pistol, .50 caliber machine gun, and .30 caliber Springfield and M-1 rifles (.22 caliber and .38 caliber were also used based on field observations). Former structures at this FUDS included a water tower, six “pill boxes”, numerous concrete footings of old buildings, and numerous inhabited buildingsy. Historically, no MEC items have been found; none were observed during the 1991 USACE INPR site visit or during the 2010 SI field activities. Expended bullets and bullet casings were observed during the 2010 SI activities; however, all items were small arms and expended. Therefore, there is no evidence of munitions (UXO or DMM) at MRS 1. Refer to Paragraphs ES.7, 2.4.2.2, 2.4.3.2, 2.5.1, 2.5.2, 2.5.3, 4.1.2, 4.2.1.1, 4.3.1.1, 4.3.1.2, 6.1.0.2, 7.0.2 and Tables 2-1 and 2-2 of the Alion SI Report for more information concerning the historical activities at MRS 1.

TABLES 2 - 9 ARE INTENTIONALLY OMITTED ACCORDING TO ARMY GUIDANCE

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	0
Source of Hazard	Table 2		
Accessibility Factor Data Elements			
Location of Munitions	Table 3		0
Ease of Access	Table 4		
Status of Property	Table 5		
Receptor Factor Data Elements			
Population Density	Table 6		0
Population Near Hazard	Table 7		
Types of Activities/ Structures	Table 8		
Ecological and /or Cultural Resources	Table 9		
EHE MODULE TOTAL			(0)

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	***No Known or Suspected Explosive Hazard***

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond to **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms CWM/UXO, CWM/DMM, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS is: ◆ CWM that are UXO (i.e., CWM/UXO). ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: ◆ Nonexplosively configured CWM/DMM either damaged or undamaged ◆ Bulk CWM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	(0)
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	(0)

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

TABLES 12 - 19 ARE INTENTIONALLY OMITTED ACCORDING TO ARMY GUIDANCE

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		0
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		0
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			(0)

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	***No Known or Suspected CWM Hazard***

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the contaminant ratios together, including any additional groundwater contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and display the CHF Value. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ■

Table 21 Comments: Based on stakeholder agreement at the TPP meeting, groundwater is not a medium of concern; therefore, groundwater was not sampled during this SI. Refer to Appendix J (CSM) and Paragraphs 2.3.6.3, 2.3.7.1, and 5.2.0.4.

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface water and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the contaminant ratios together, including any additional surface water contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for human endpoints present in the surface water, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ■

Table 22 Comments: Based on stakeholder agreement at the TPP meeting, surface water is not a medium of concern; therefore, surface water was not sampled during this SI. Refer to Appendix J (CSM) and Paragraph 5.2.0.4.

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's sediment and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the contaminant ratios together, including any additional sediment contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ■

Table 23 Comments: Based on stakeholder agreement at the TPP meeting, sediment is not a medium of concern; therefore, sediment was not sampled during this SI. Refer to Appendix J (CSM) and Paragraph 5.2.0.4.

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface water and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the contaminant ratios together, including any additional surface water contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ■

Table 24 Comments: Based on stakeholder agreement at the TPP meeting, surface water is not a medium of concern; therefore, surface water was not sampled during this SI. Refer to Appendix J (CSM) and Paragraph 5.2.0.4.

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's sediment and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios together, including any additional sediment contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ■

Table 25 Comments: Based on stakeholder agreement at the TPP meeting, sediment is not a medium of concern; therefore, sediment was not sampled during this SI. Refer to Appendix J (CSM) and Paragraph 5.2.0.4.

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface soil and their comparison values (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the contaminant ratios together, including any additional surface soil contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios
Lead	880	400	mg/Kg	2.2
Copper	66	3100	mg/Kg	0.021
Nickel	17	1600	mg/Kg	0.011
Nitroglycerine	5.7	1000	mg/Kg	0.0057

CHF Scale	CHF Value	Sum The Ratios	2.2
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	(M)

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	(M)

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	(M)
	No Known or Suspected Surface Soil MC Hazard	☐

Table 26 Comments: Seven surface soil samples were collected at MRS 1. Maximum concentrations were derived from the following samples: lead (MBTR-MR1-SS-01-01), copper (MBTR-MR1-SS-01-03), nickel (MBTR-MR1-SS-01-03), and NG (MBTR-MR1-SS-01-06). Refer to Table 5-1 of the SI report for more information.

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Only use this table if there are more than five contaminants in any given medium present at the MRS. This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the media in which these contaminants are present. Then record all contaminants, their maximum concentrations and their comparison values (from Appendix B of the Primer) in the table below. Calculate and record the ratio for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF for each medium on the

Note: Dissolved, rather than total, metals analyses are used when both are available.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28
Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the Contaminant Hazard, Migration Pathway, and Receptor Factors for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the Three-Letter Combination boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the HHE Ratings provided below, determine each media's rating (A-G) and record the letter in the corresponding Media Rating box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value	Three-Letter Combination (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)					
Surface Water/Human Endpoint (Table 22)					
Sediment/Human Endpoint (Table 23)					
Surface Water/Ecological Endpoint (Table 24)					
Sediment/Ecological Endpoint (Table 25)					
Surface Soil (Table 26)	M	M	M	MMM	D

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the HHE Module Rating box.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	**D**

HHE Ratings (for reference only)	
Combination	**Rating**
HHH	A
HHM	B
HHL	C
HMM	C
HML	D
MMM	D
HLL	E
MML	E
MLL	F
LLL	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter rating for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical priority for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the MRS Prioriy or Alternative MRS Rating at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	(D)	(5)
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		*No Known or Suspected CWM Hazard*		No Known or Suspected MC Hazard	
MRS PRIORITY or ALTERNATIVE MRS RATING				(5)	

APPENDIX L – REFERENCE COPIES

Located on CD.

Final

Response to Stakeholder Comments- Site Inspection Report for Madison Barracks Target Range, Henderson, New York

FUDS Project # **C02NY020400**

Prepared Under: **Contract No. W912DY-04-D-0017**
Delivery Order # 00170001

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December 2010

PROJECT: Madison Barracks Target Range Site Inspection (SI) (C02NY020400)			
STAKEHOLDER REVIEW COMMENTS			
		REVIEW: Draft Final SI Report, November 2010 DATE: 8 December 2010 NAME: Dan Eaton, NYDEC	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1.	General	Thank you for the opportunity to review the Site Inspection Report for the Madison Barracks Project. The NYSDEC agrees with the conclusion in the report that additional work will be necessary at the former shooting range and understand that the next step in the process would be an Remedial Investigation. If possible, we would also support discussion of a presumptive remedy for the berm.	A-ACCEPTED/CONCUR. Comment noted. Further remedial alternatives will be developed and reviewed in accordance with the CERCLA process.

PROJECT: Madison Barracks Target Range Site Inspection (SI) (C02NY020400)			
STAKEHOLDER REVIEW COMMENTS			
		REVIEW: Draft Final SI Report, November 2010 DATE: 9 December 2010 NAME: Alida Karas, USEPA Region 2	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1.	General	EPA will not be submitting comments on this, deferring to NYDEC. Thanks!	A-ACCEPTED/CONCUR. Comment noted.

PROJECT: Madison Barracks Target Range Site Inspection (SI) (C02NY020400)			
STAKEHOLDER REVIEW COMMENTS			
		REVIEW: Draft Final SI Report, November 2010 DATE: 9 December 2010 NAME: Brian Thomas, NYS OPRHP	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1.	General	Can Army Corp provide a map where we can find the location of the spent ammunition mentioned in the report?	A-ACCEPTED/CONCUR. The specific location of each expended small arms ammunition bullet (munitions debris [MD], presenting no explosive hazard) was not marked with the GPS unit during the SI field event. The MD found during the field event were located within the impact berm. The impact berm is shown on Figure 3-1 where samples MBTR-MR1-SS-01-(01 through 05) were collected.
2.	General	Is there any information on sampling of the area behind the berm/concrete wall (and any findings).	A-ACCEPTED/CONCUR. Sample locations were biased to areas where MC would be at the greatest concentration (impact berm). Due to observations of MD during the field event on the front side of the impact berm, samples were collected in that location. There is no information on sampling of the area behind the berm; however, as shown in Photographs E.7 and E.9 (Appendix E of the SI Report), qualitative reconnaissance was performed behind the impact berm and no small arms bullets were found in this area.
3.	Page 6-1	The information presented on page 6-1 covers the dates of acquisition and ending use. Did the study identify the years of operation of the target range and the amount of ammunition used? This is information that would also be useful as part of the historical interpretation of the property.	A-ACCEPTED/CONCUR. No information regarding the specific years of operation of the target range or the amount of ammunition used at MRS 1 was found during the historical research.
4.	Page 6-2	We have trails for skiing and hiking in the firing range area. What are the impacts of the lead and copper levels on risk assessment (human, animal and environmental) of the material that is present at the site? This question results from the information on Page 6-2.	A-ACCEPTED/CONCUR. The conclusions of the risk screening for MRS 1 were that lead was determined to present a potentially unacceptable risk to human receptors and lead and copper were determined to present potentially unacceptable risks to ecological receptors based on exceedances of human health screening level (lead) and ecological screening levels (lead and copper). Potential exposure routes for humans from lead in surface soil are dermal and ingestion. Skiing would occur when snow is on the ground; therefore, no exposure to surface

PROJECT: Madison Barracks Target Range Site Inspection (SI) (C02NY020400)			
STAKEHOLDER REVIEW COMMENTS			
		REVIEW: Draft Final SI Report, November 2010 DATE: 9 December 2010 NAME: Brian Thomas, NYS OPRHP	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
			soil is expected. Hikers or other recreational park visitors would have infrequent, if any, exposure based on potential pathways (dermal and ingestion) making exposure not risk significant. More specific text related to skiers and hikers was added to paragraph ES. 11 and 5.2.0.2 of the Final SI Report. More detailed information regarding analytical sample results and risk screening is contained in Section 5.4 of the SI Report. The SI risk screening is an assessment of the risks to potential human and ecological receptors at the FUDS. The screening is conservative in nature and a weight-of-evidence evaluation is used to determine the significance of potential risks. Additional studies are recommended (RI/FS) to further quantify the risks from exposure to munitions constituents (MC) at this MRS.
5.	General	As a result of a recent master plan developed for the property, no construction activities are planned in the firing range area in the near future.	A-ACCEPTED/CONCUR. This information was added to Paragraph 2.3.4.1 (Current and Future Land Use) of the SI Report.
6.	General	We would like to continue mowing the firing range. We would also like to clear the brush along the firing range and the concrete wall area. This may result in some root removal.	A-ACCEPTED/CONCUR. Munitions items observed during field activities were inert; however, USACE would recommend minimal intrusive activities (mowing and vegetation cutting) instead of root removal.